

# THE IRON AGE

A Review of the Hardware and Metal Trades.

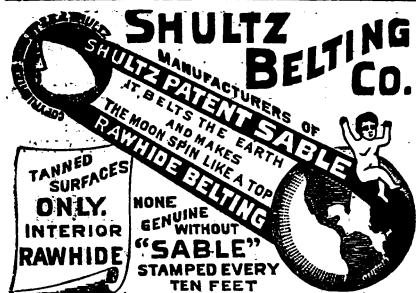
Published every Thursday Morning by David McKim, 88, 90, 98, 100 & 102 Reade St., New York.

Vol. LI: No. 18.

New York, Thursday, May 4, 1893.

\$4.50 a Year, including Postage.  
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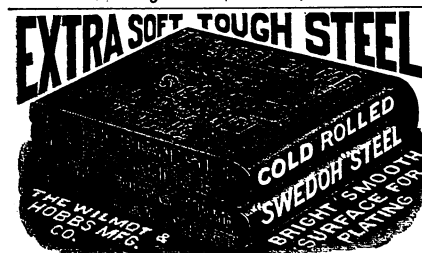
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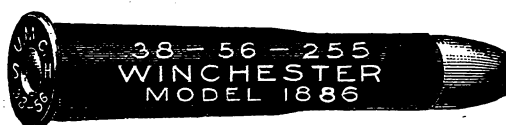
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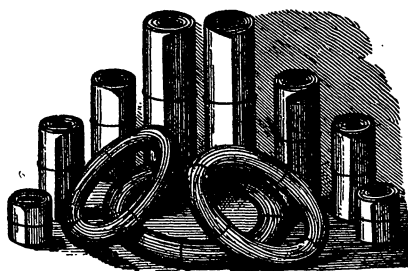
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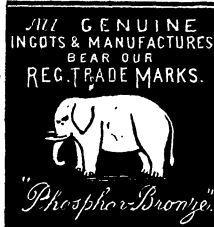
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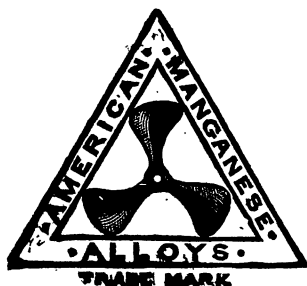
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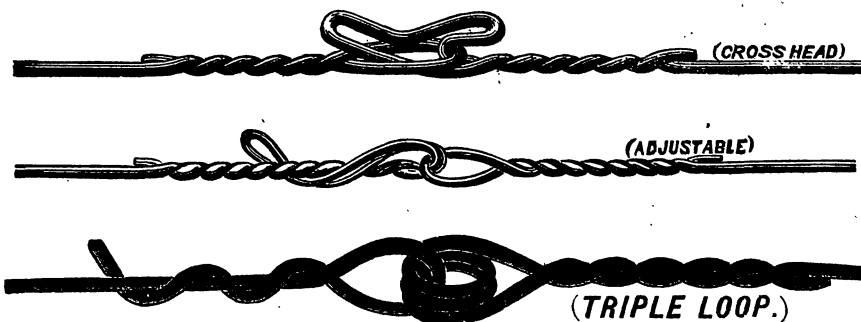
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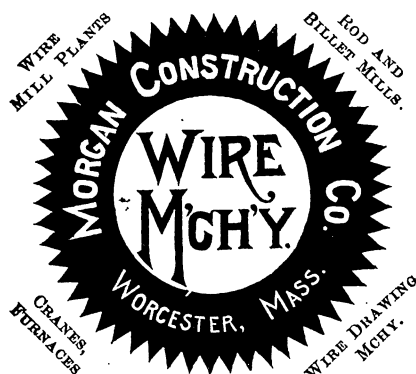


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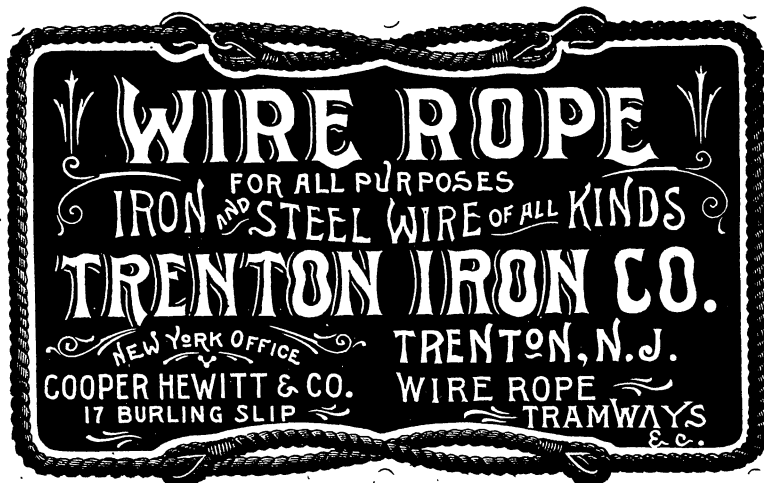
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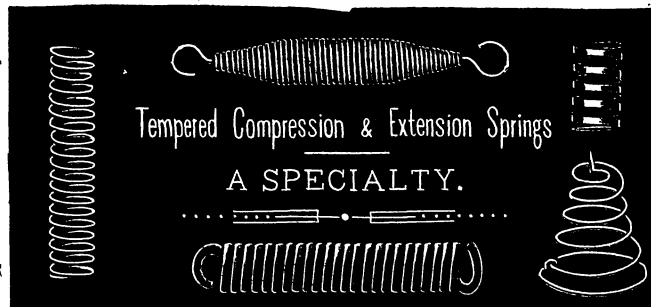
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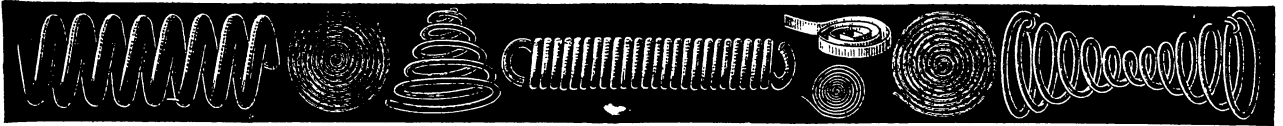
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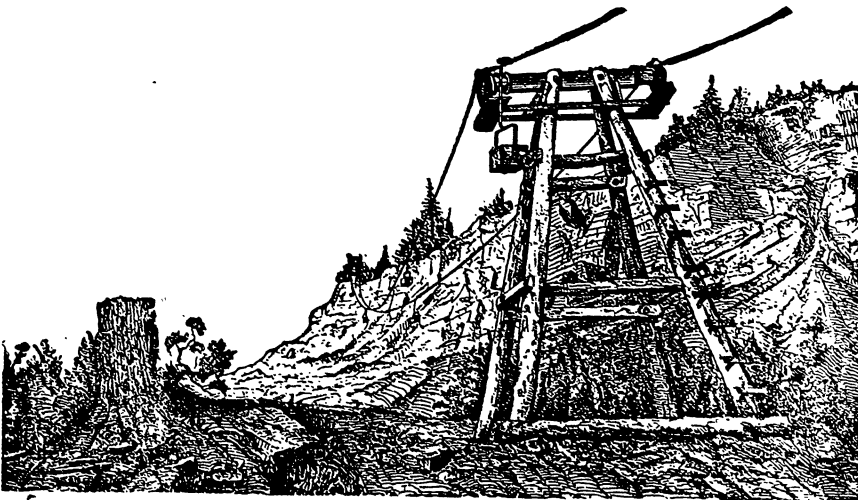
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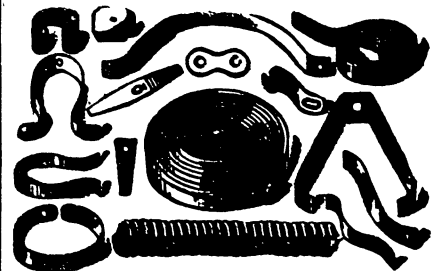
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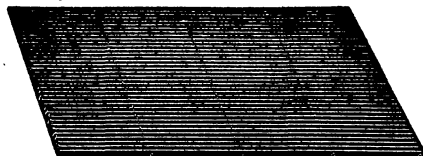
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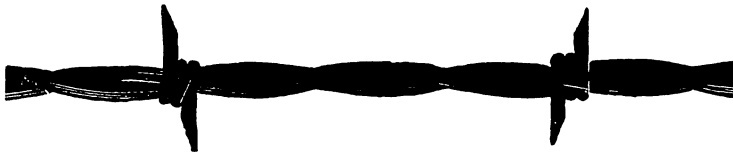
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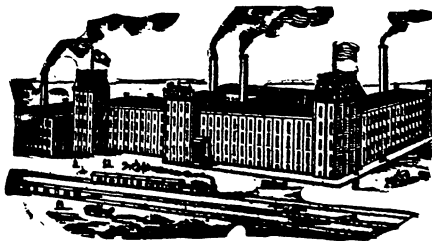


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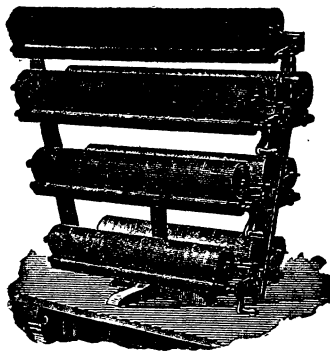


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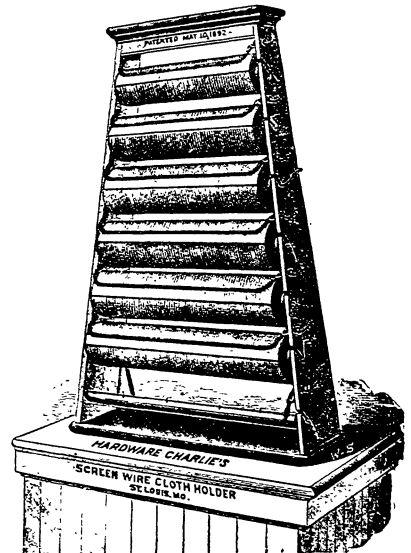
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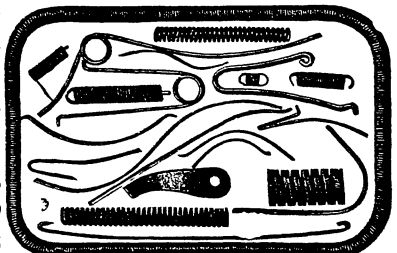
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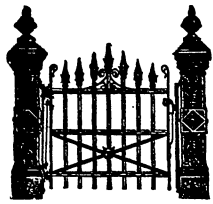
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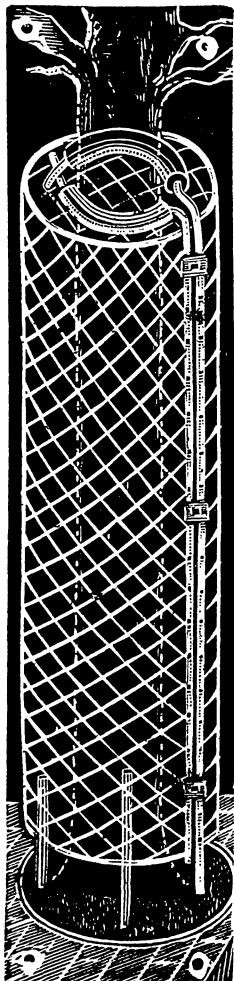
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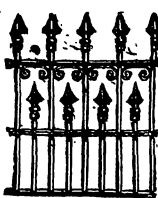
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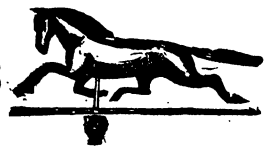


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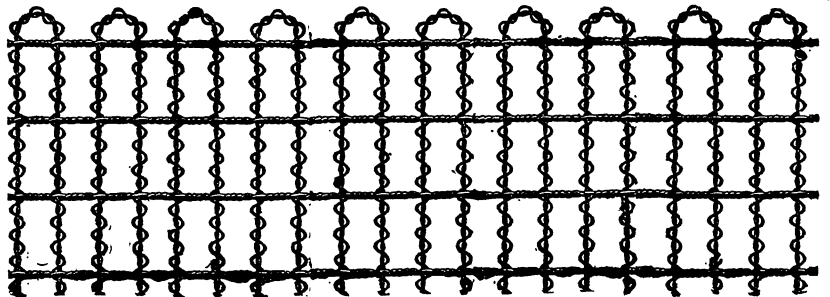
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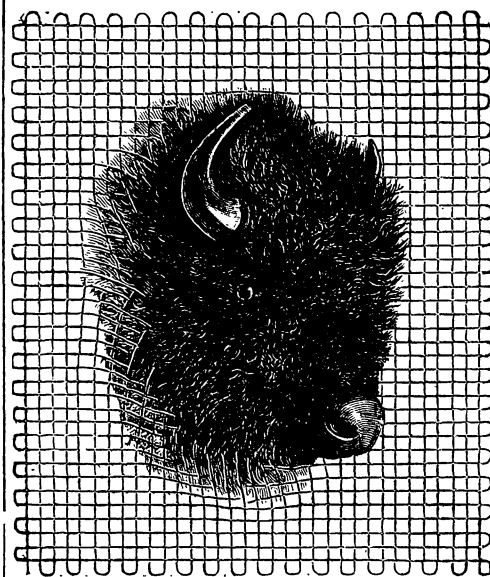
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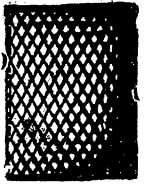


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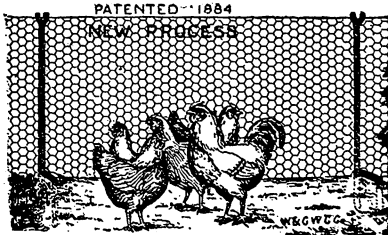
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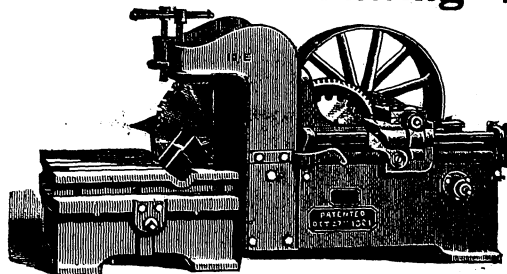
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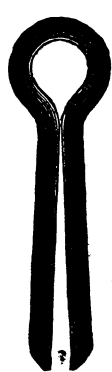
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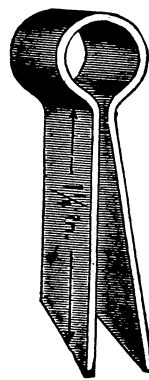
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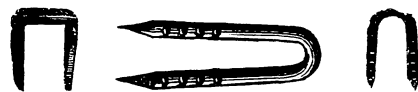
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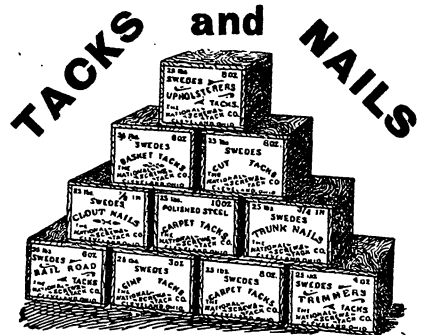
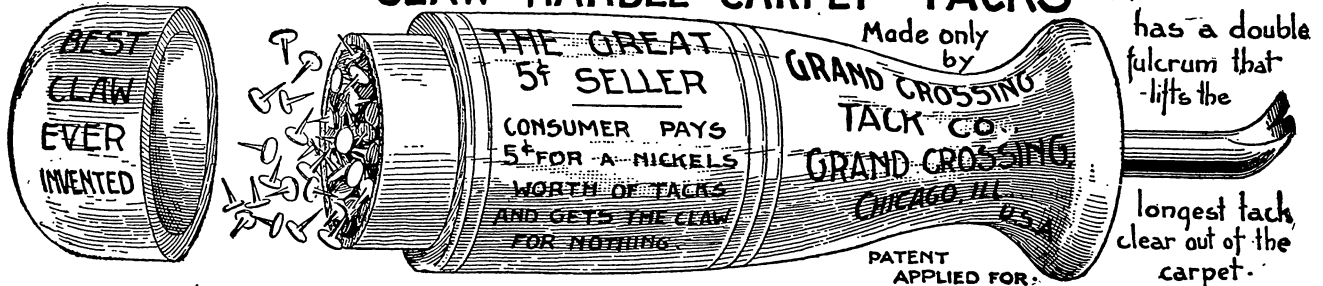
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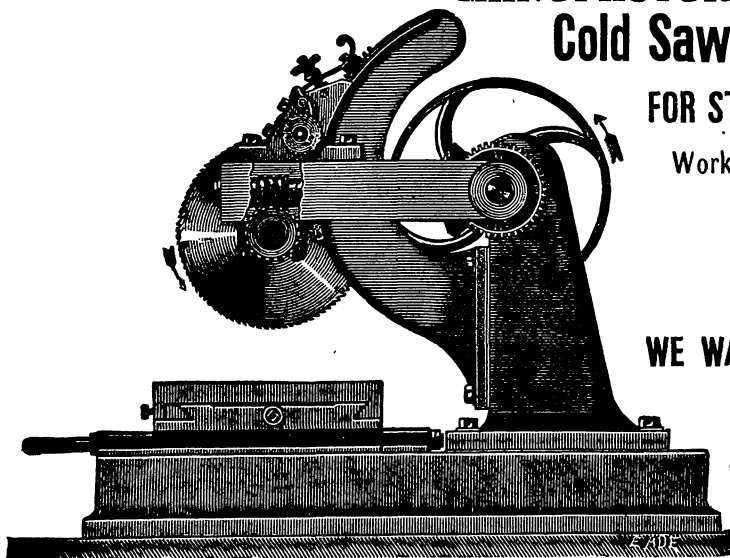
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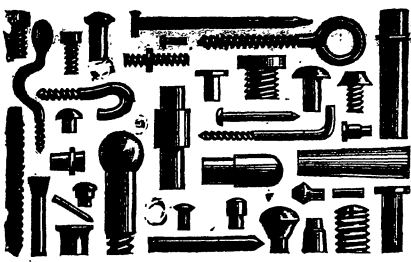
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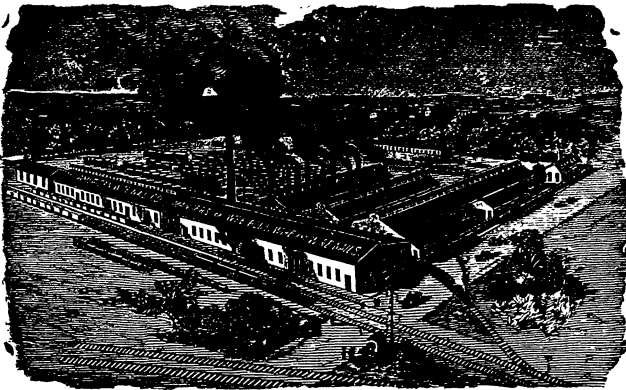


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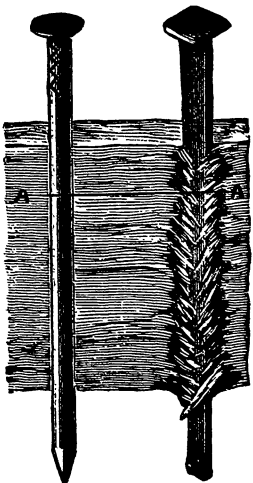
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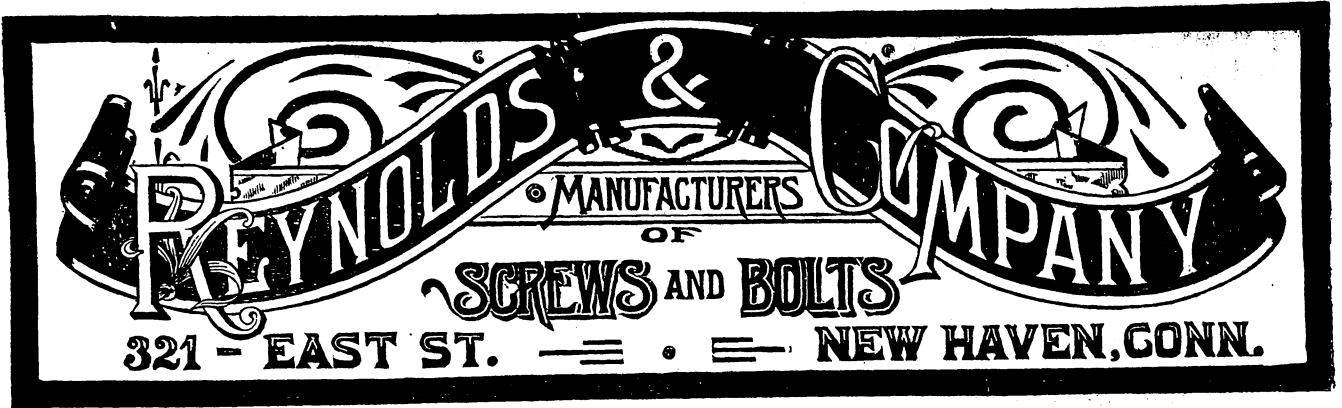
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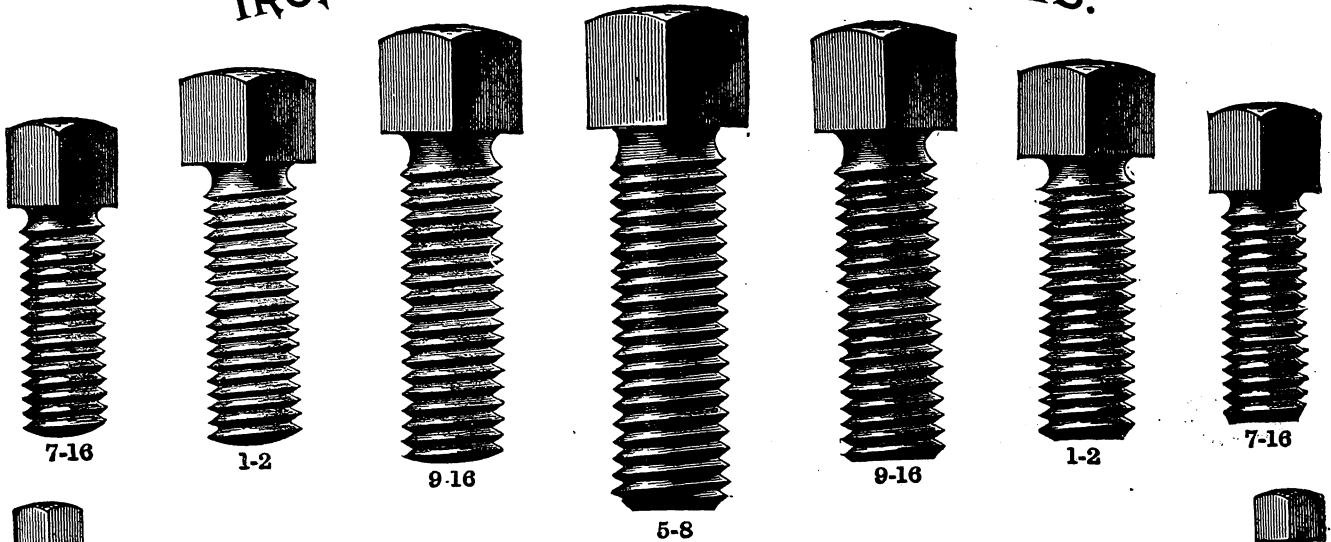
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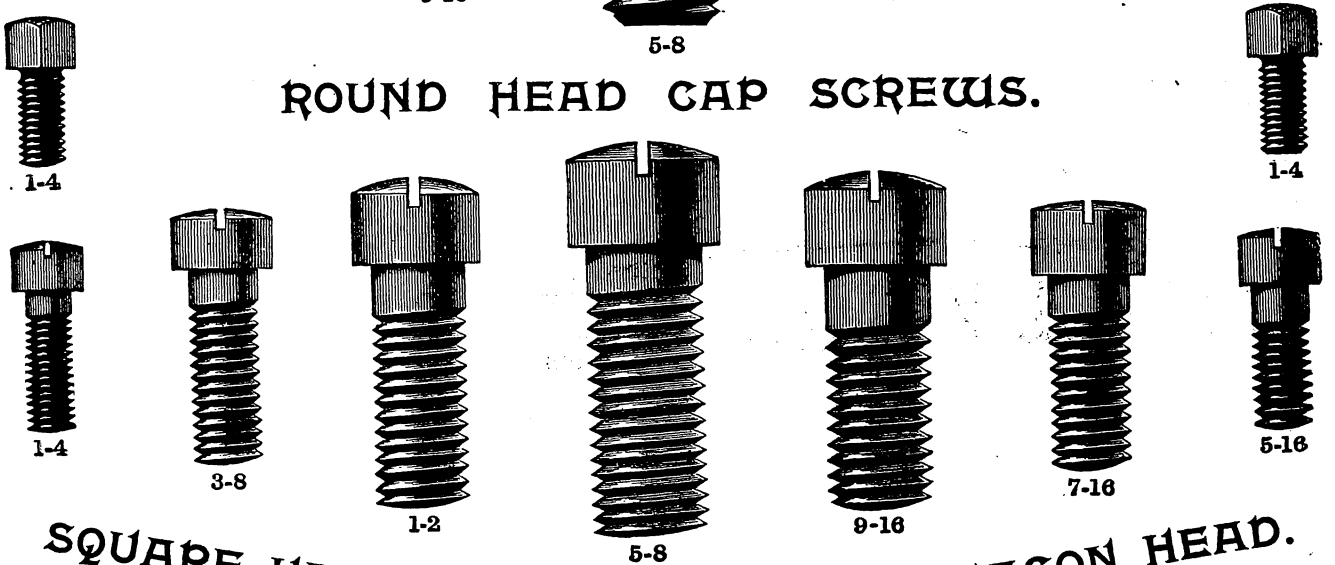
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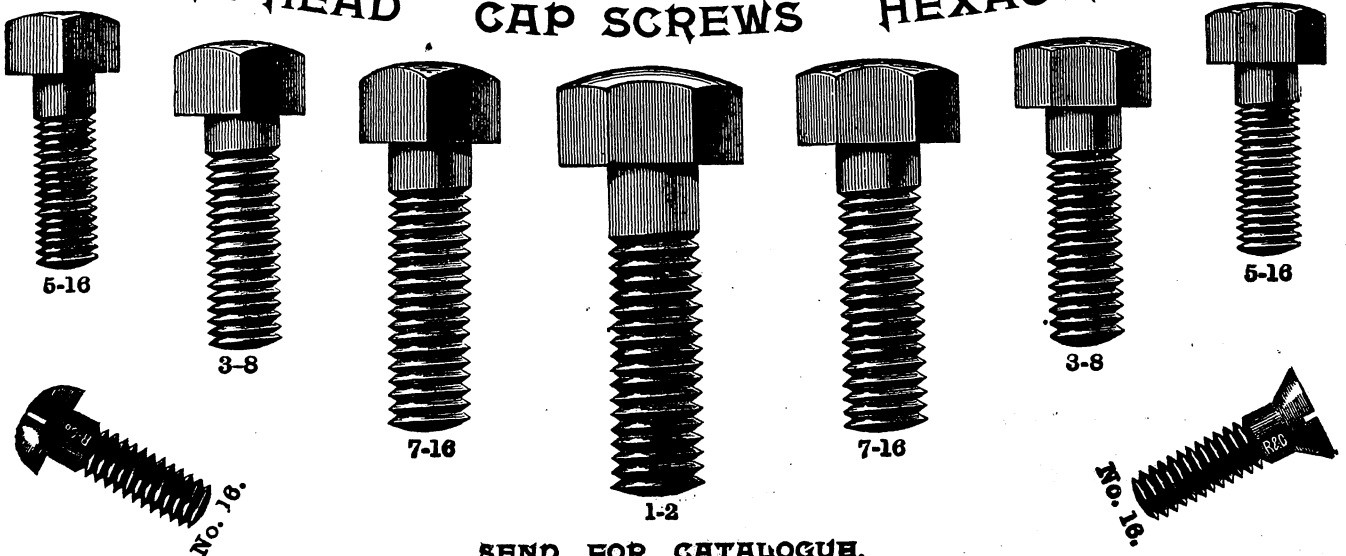
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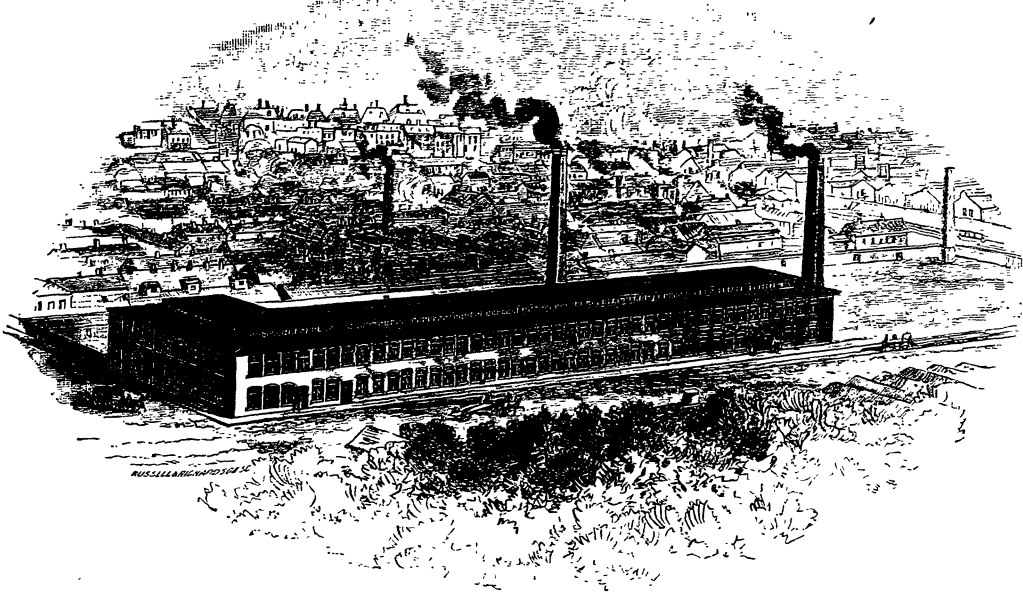


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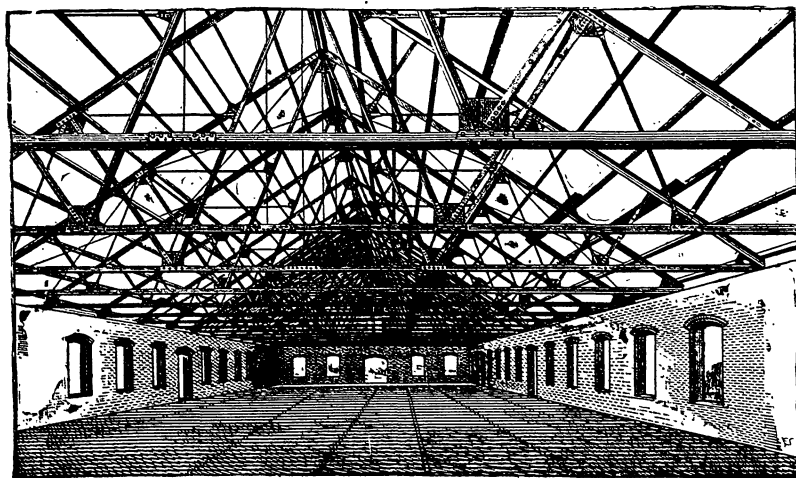
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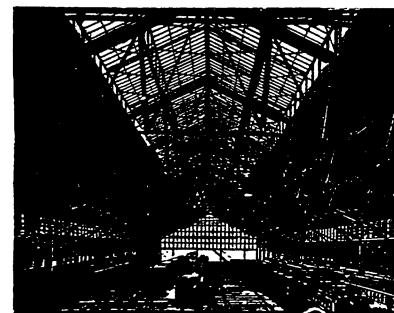
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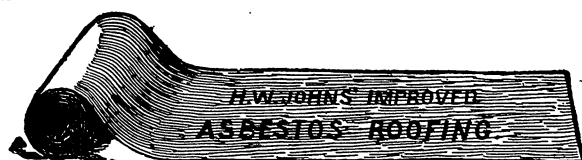
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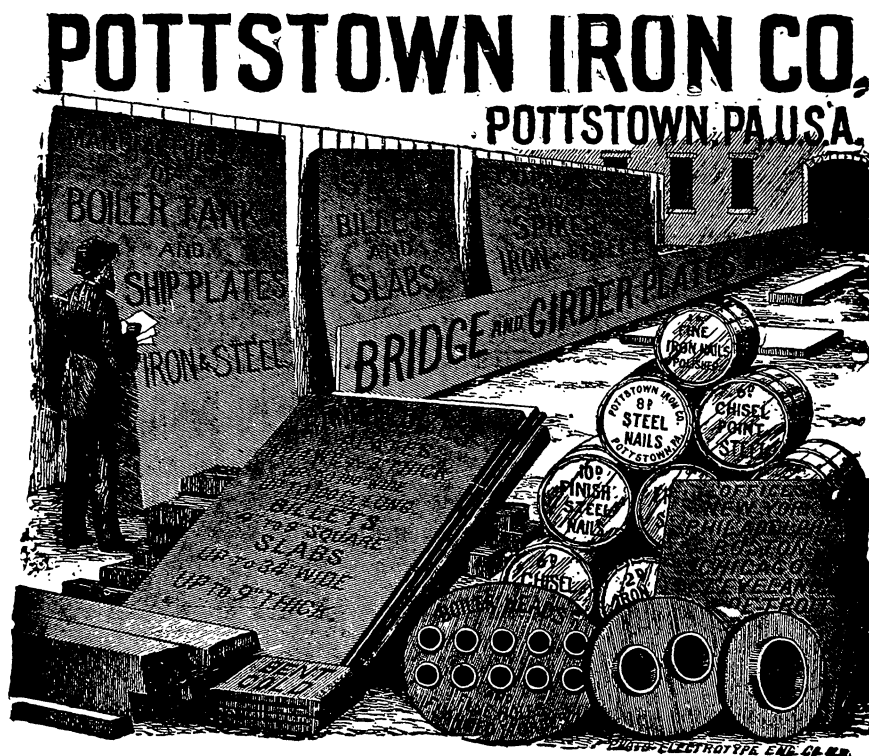
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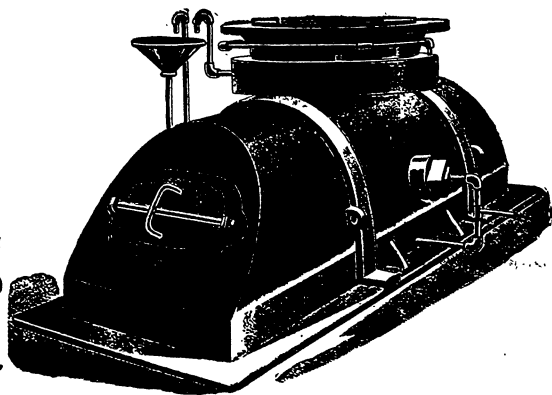
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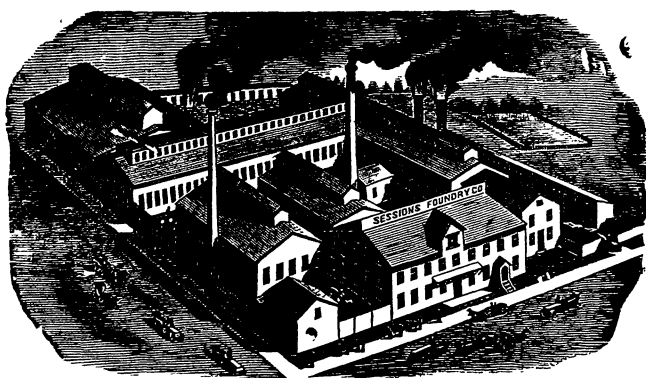
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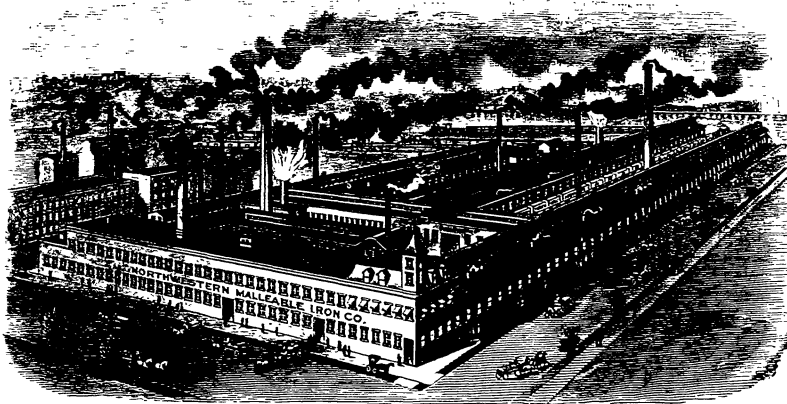
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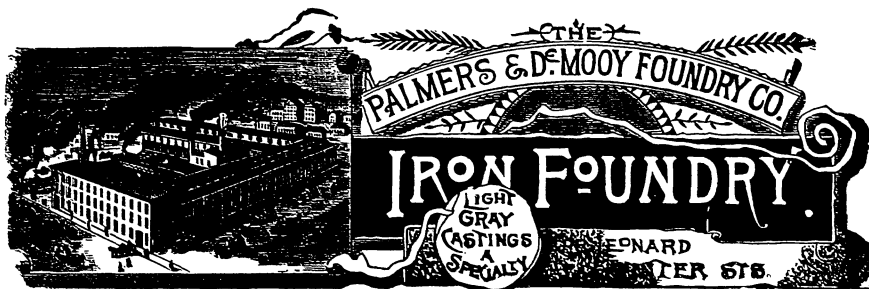
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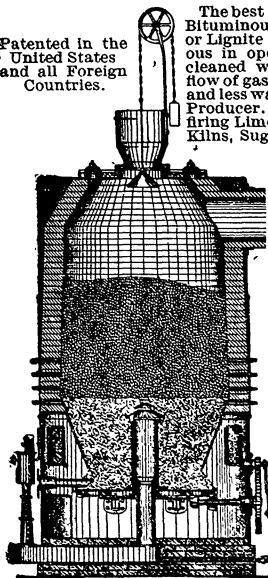
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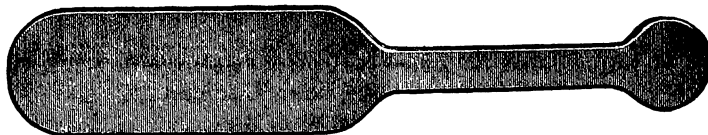
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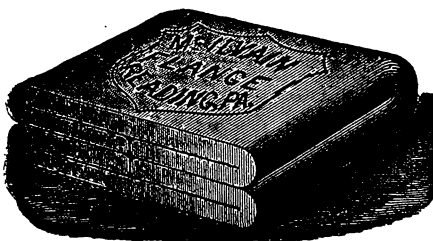
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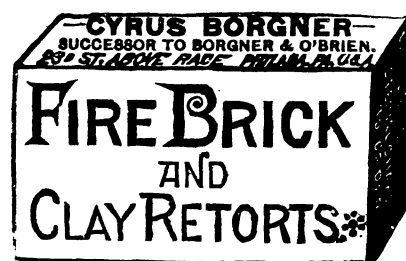
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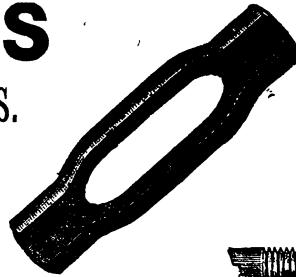
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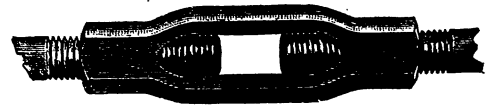
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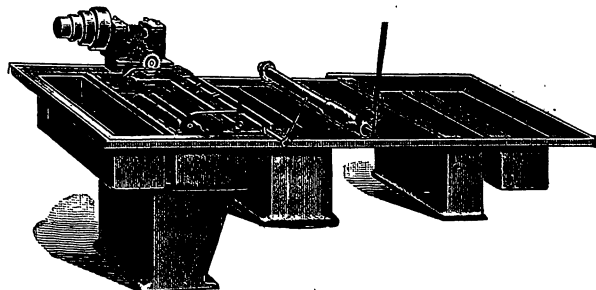
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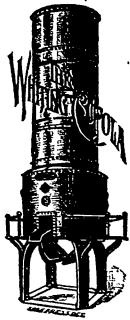
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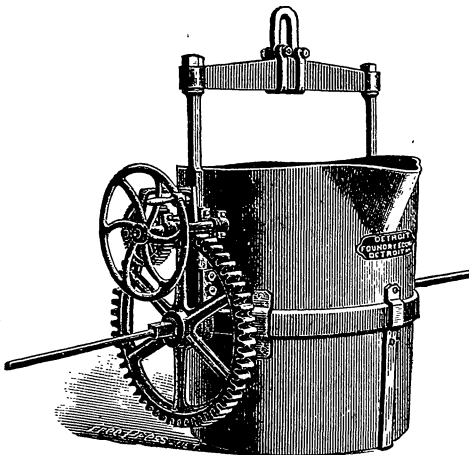
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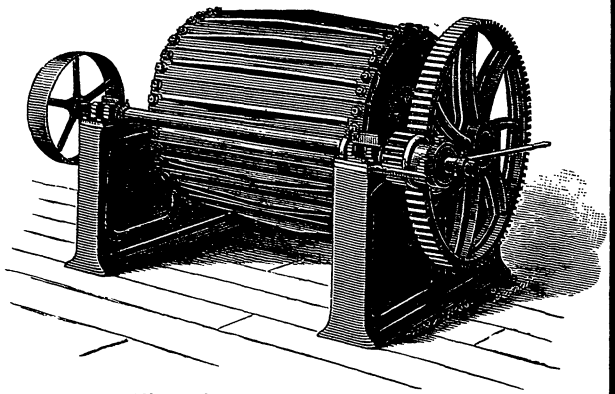
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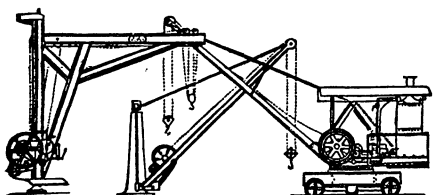
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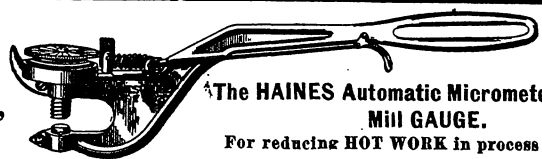
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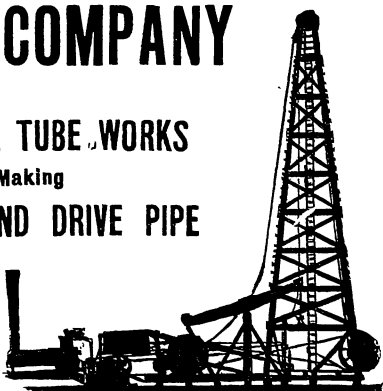
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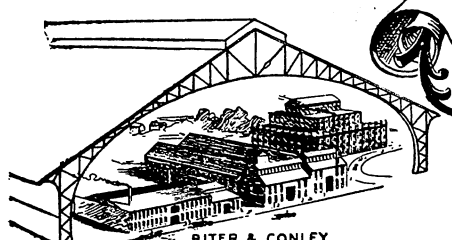
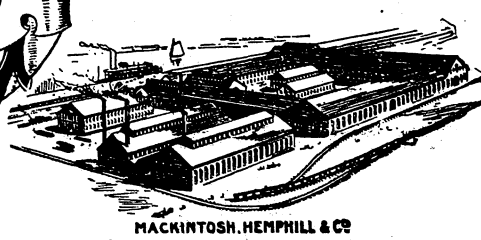


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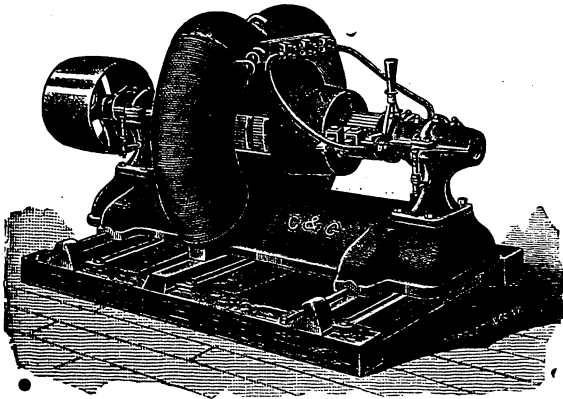
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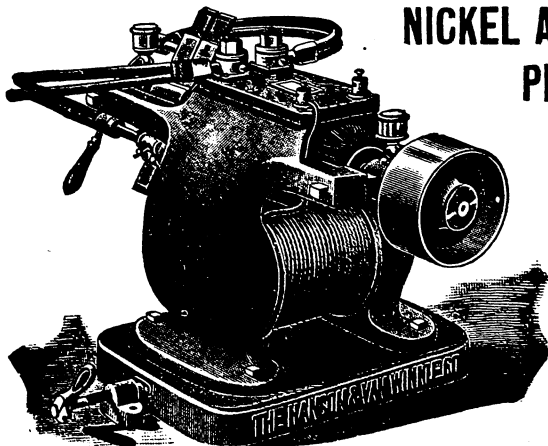


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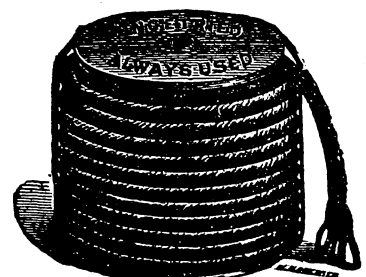
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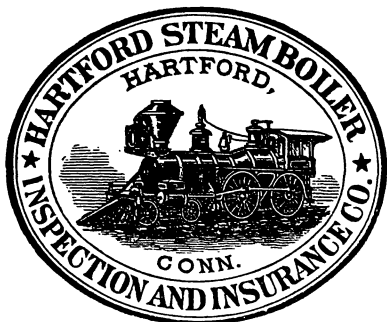


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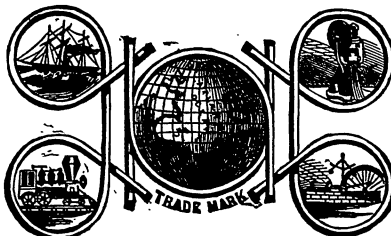
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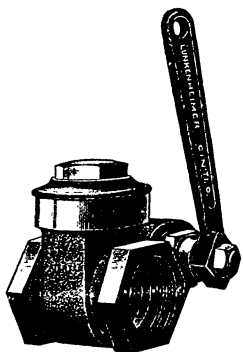
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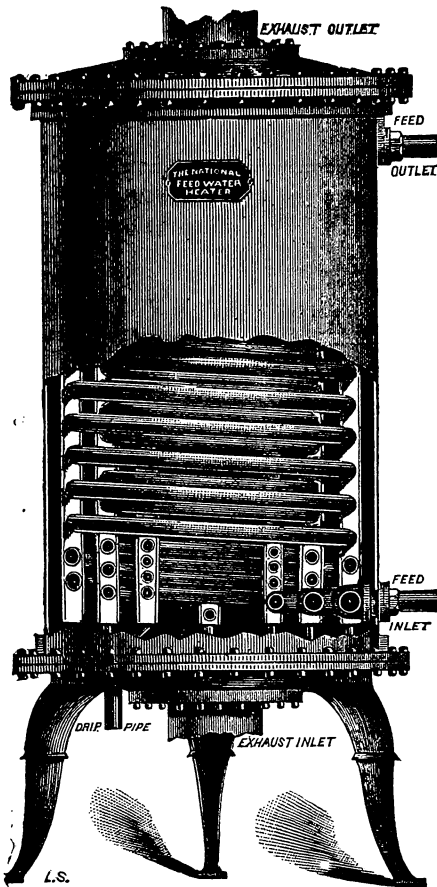
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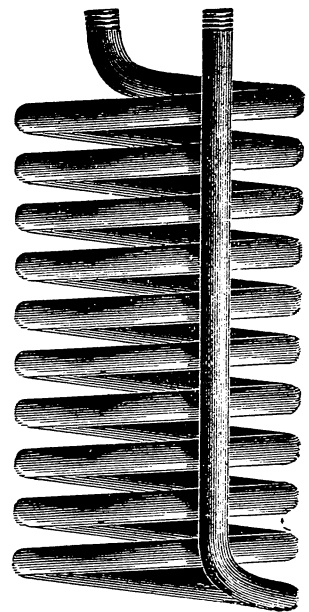
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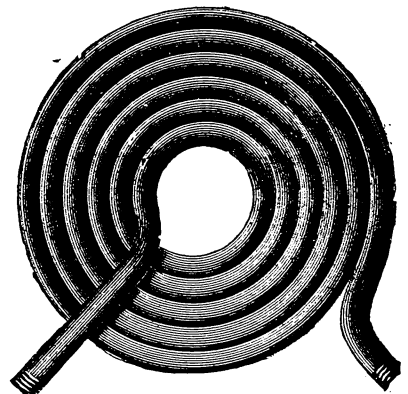
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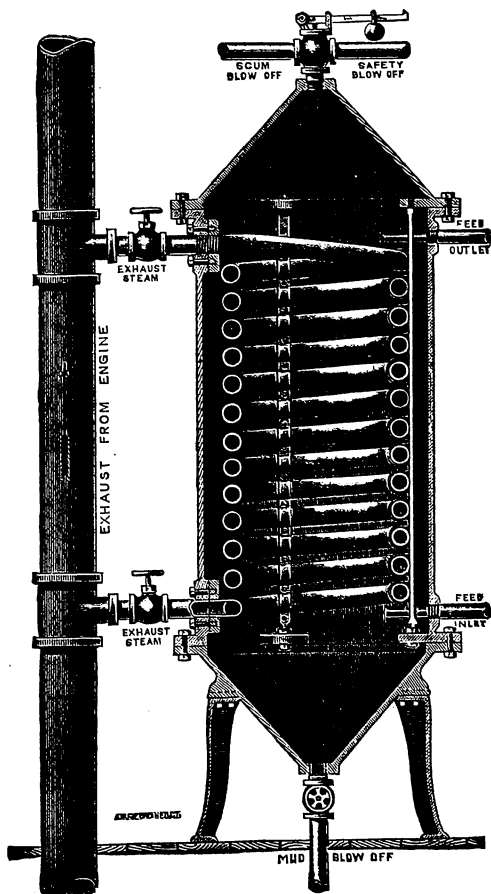


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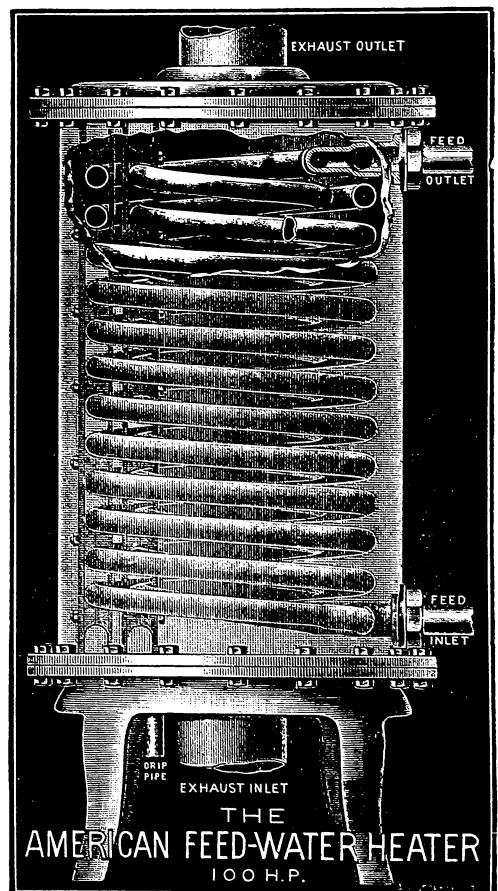
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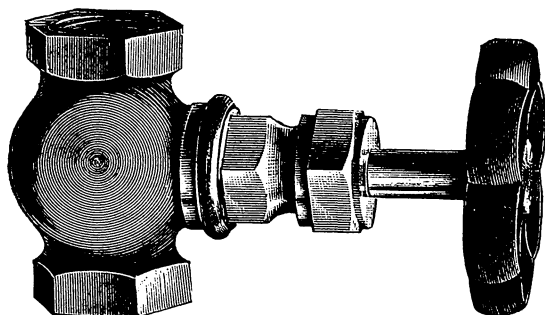


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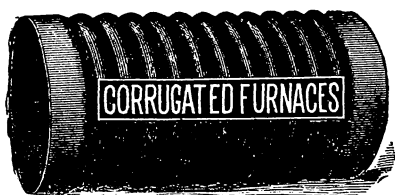
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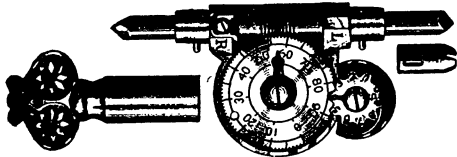
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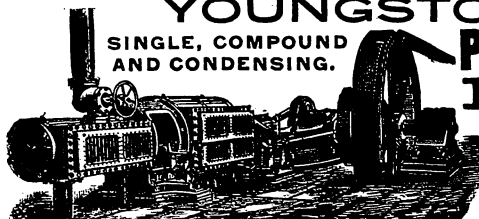
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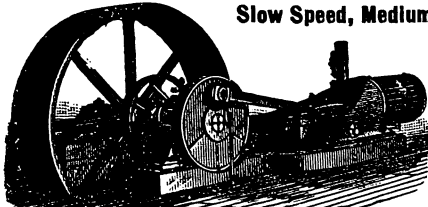
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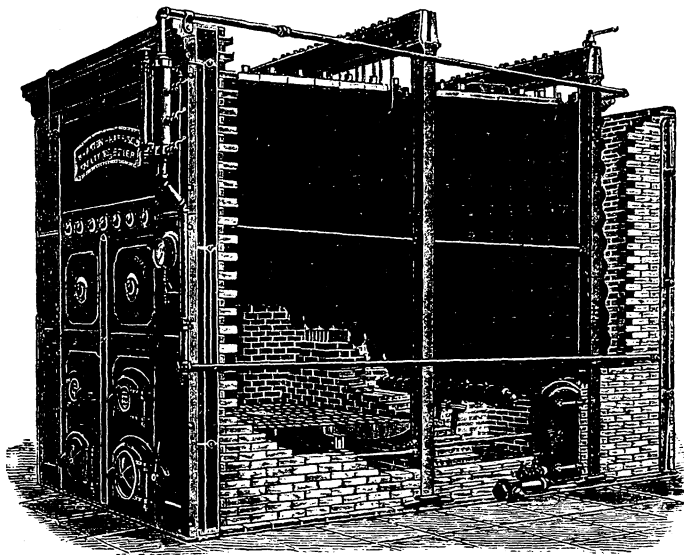


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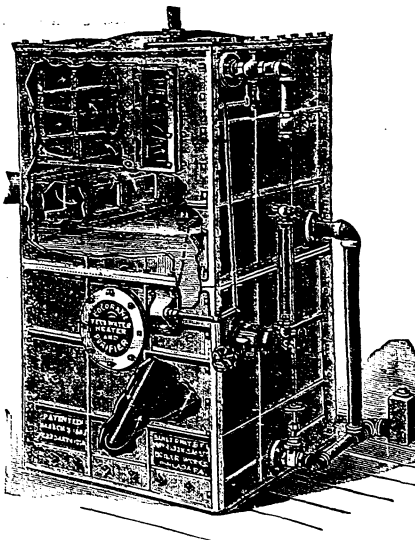
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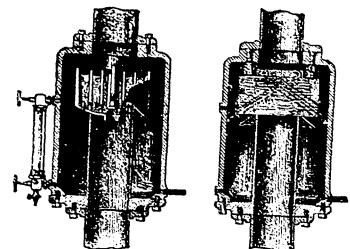
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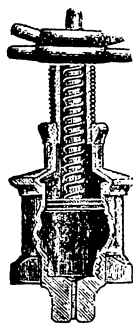


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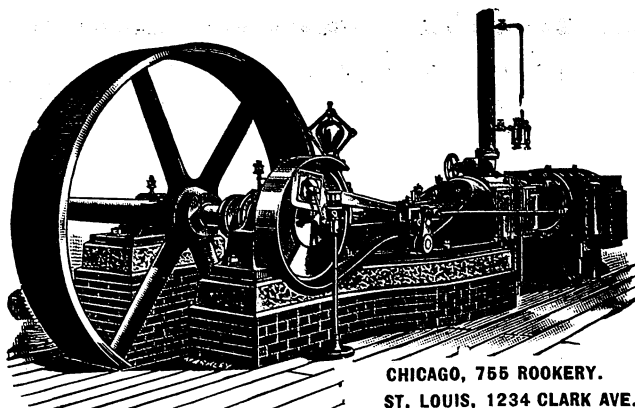
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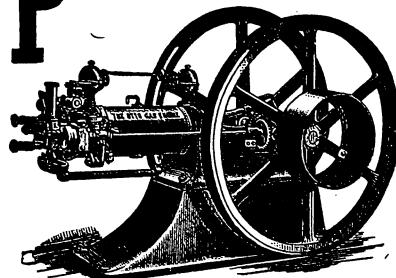
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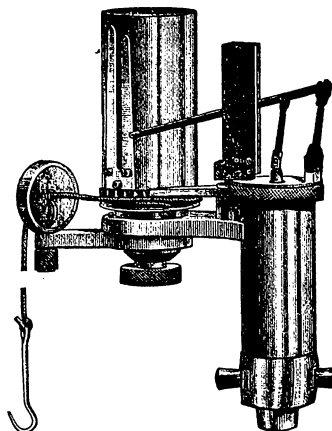
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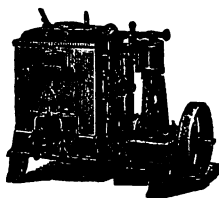
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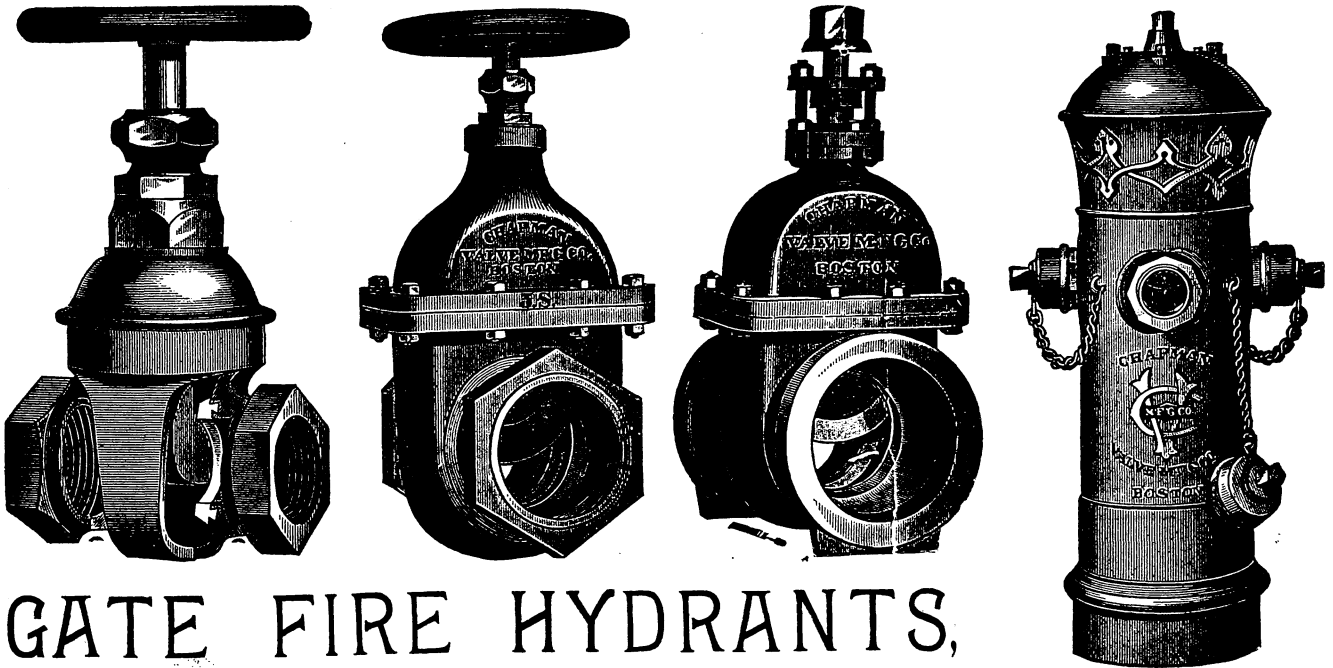




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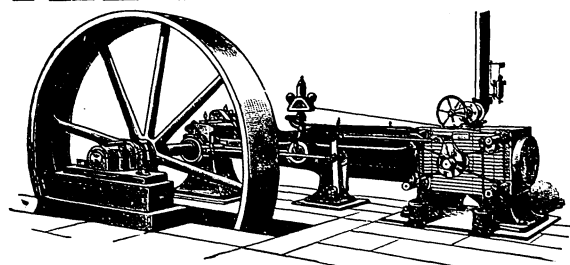
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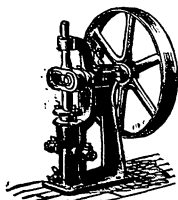
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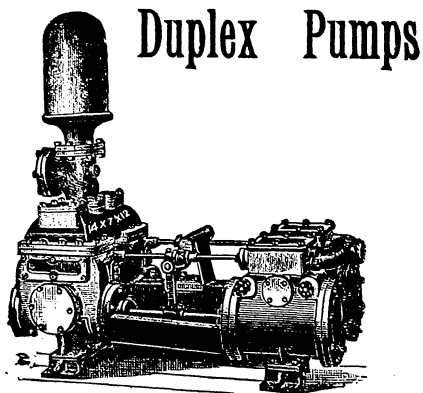
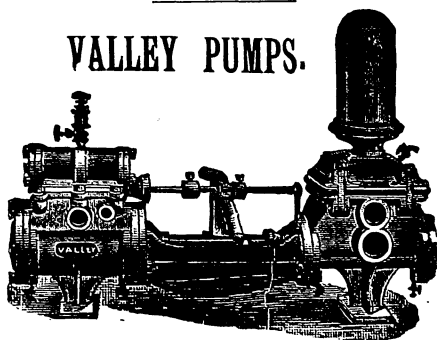
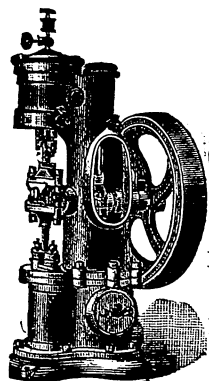
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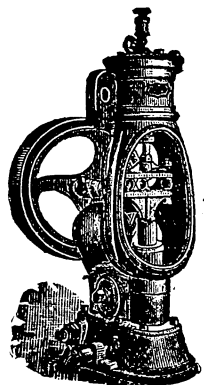
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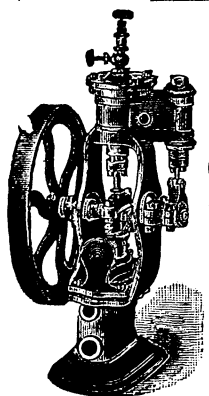


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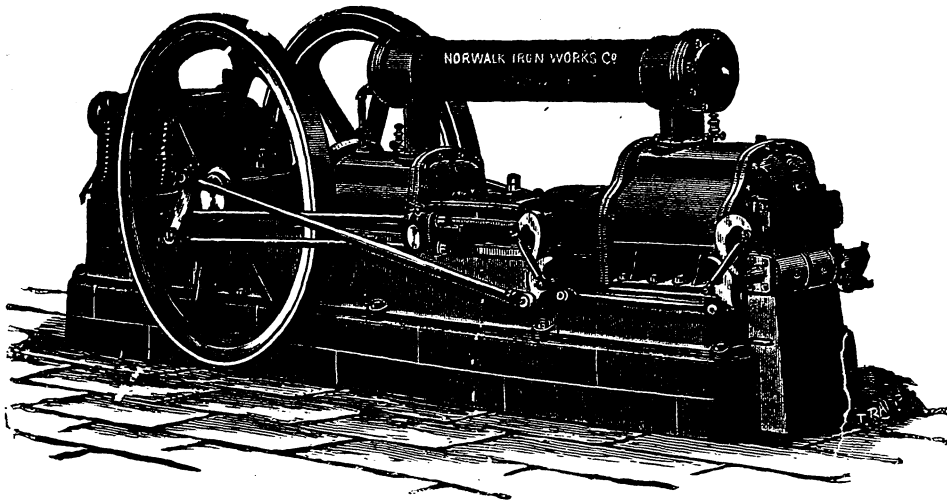
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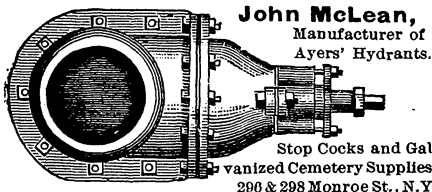
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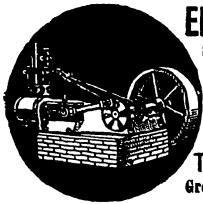
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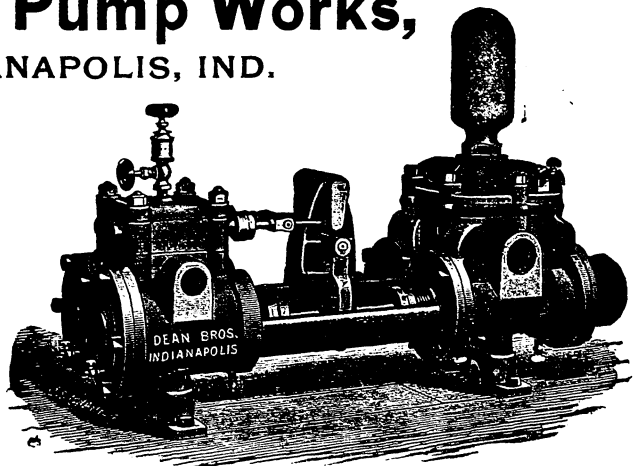


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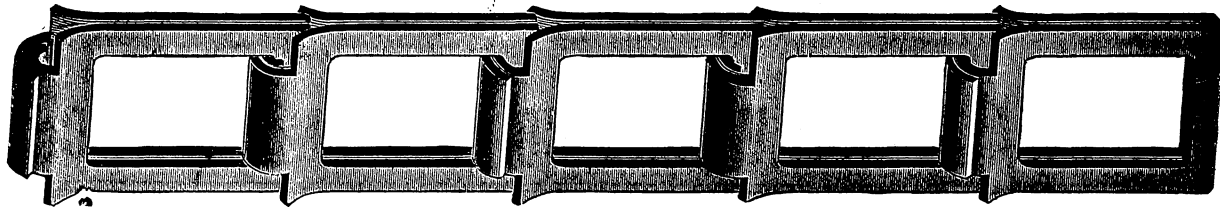
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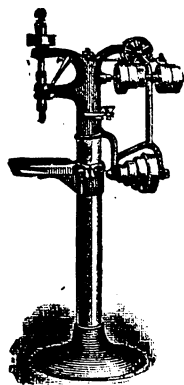
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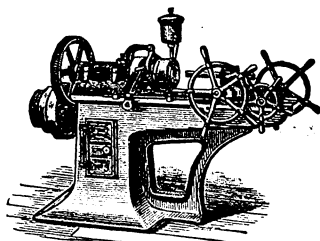
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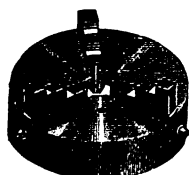
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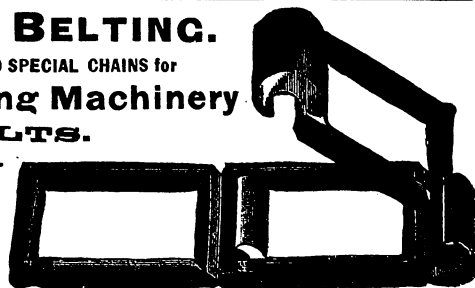
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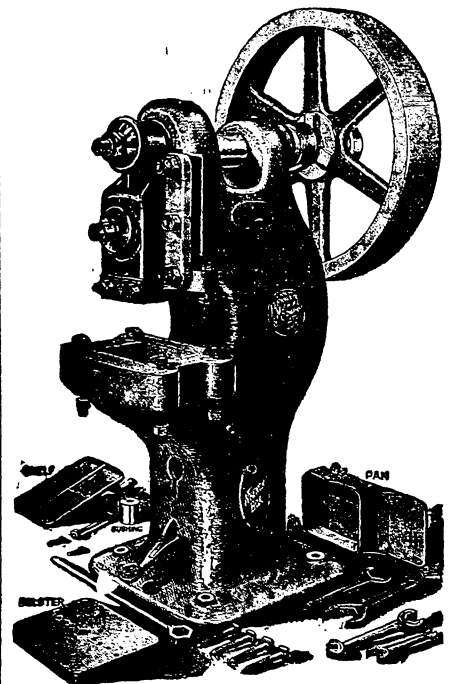
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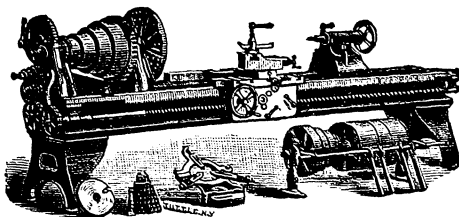
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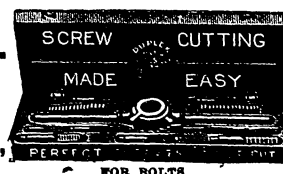
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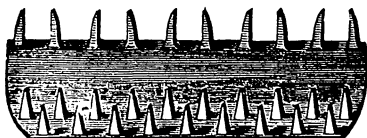
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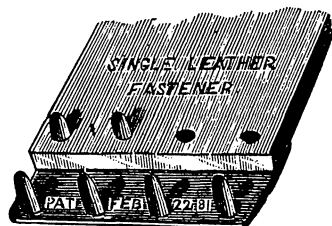
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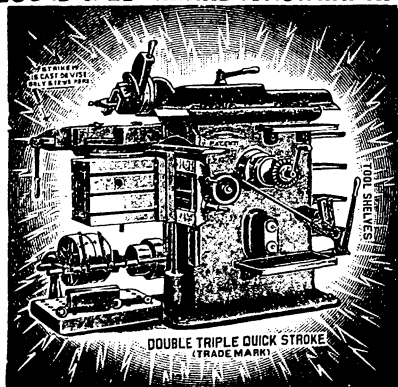
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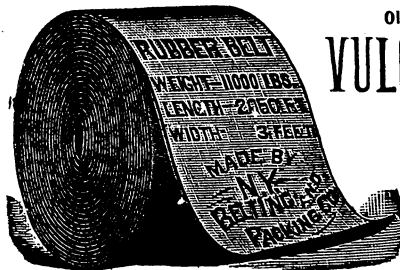
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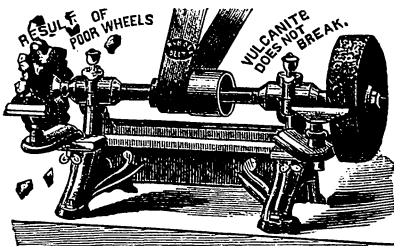
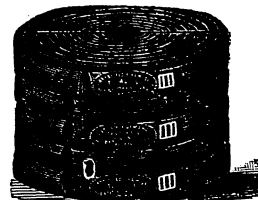
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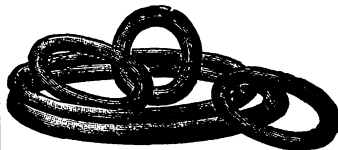
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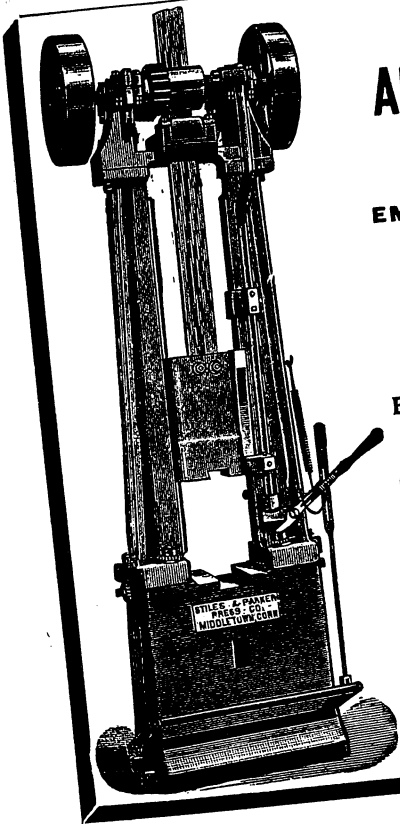
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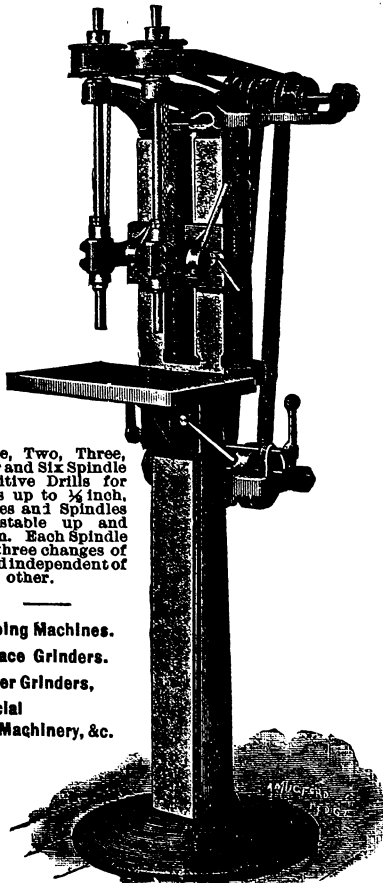
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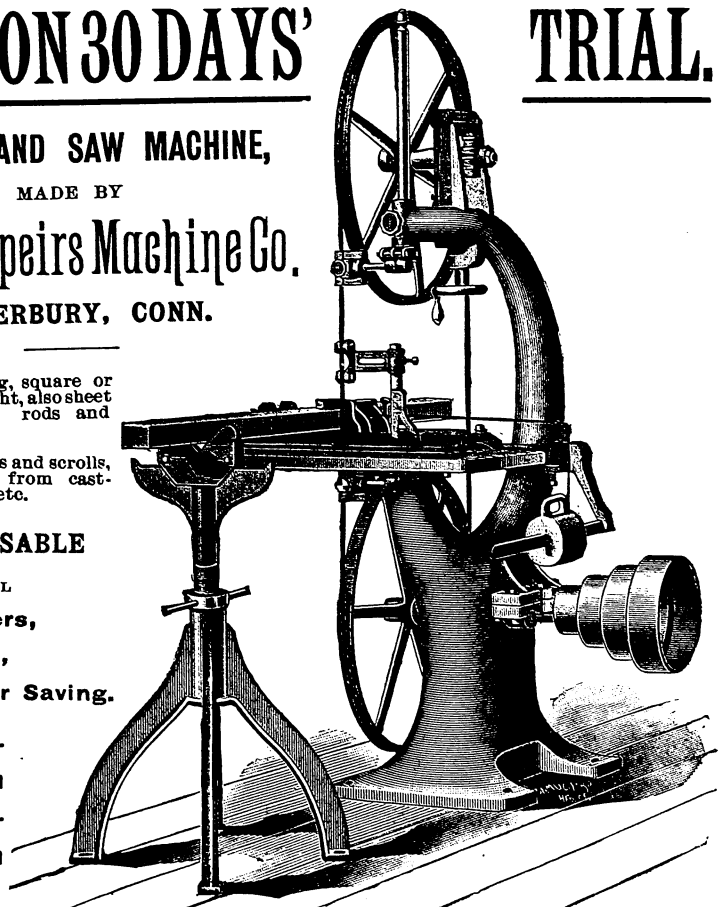
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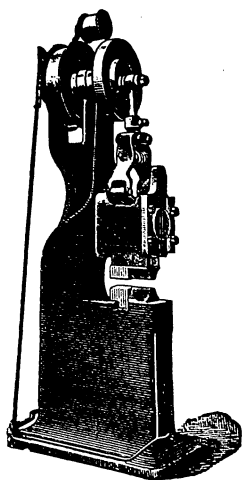
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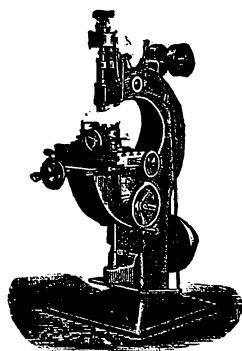
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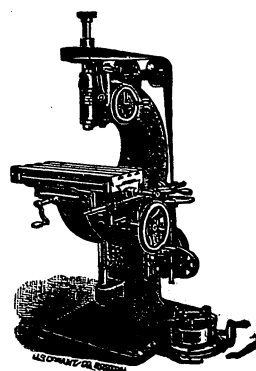
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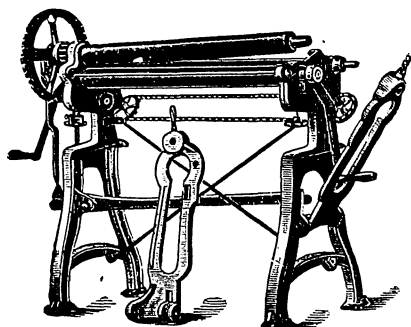
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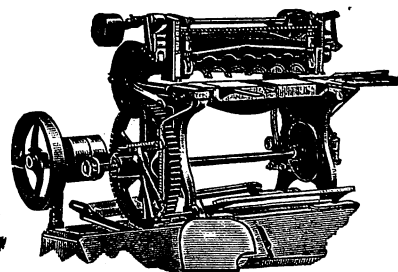
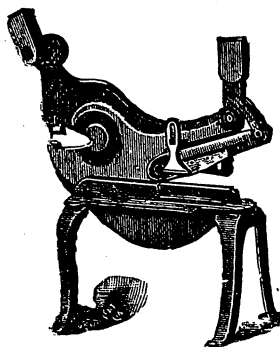


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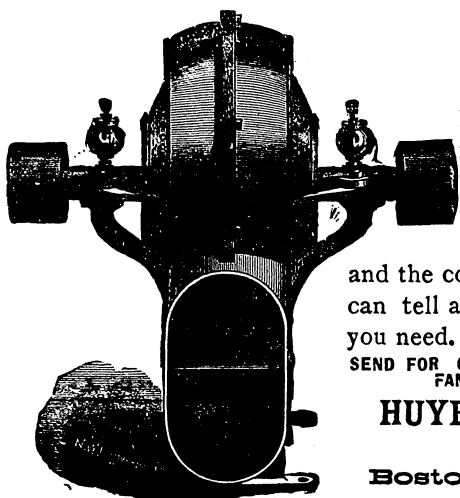
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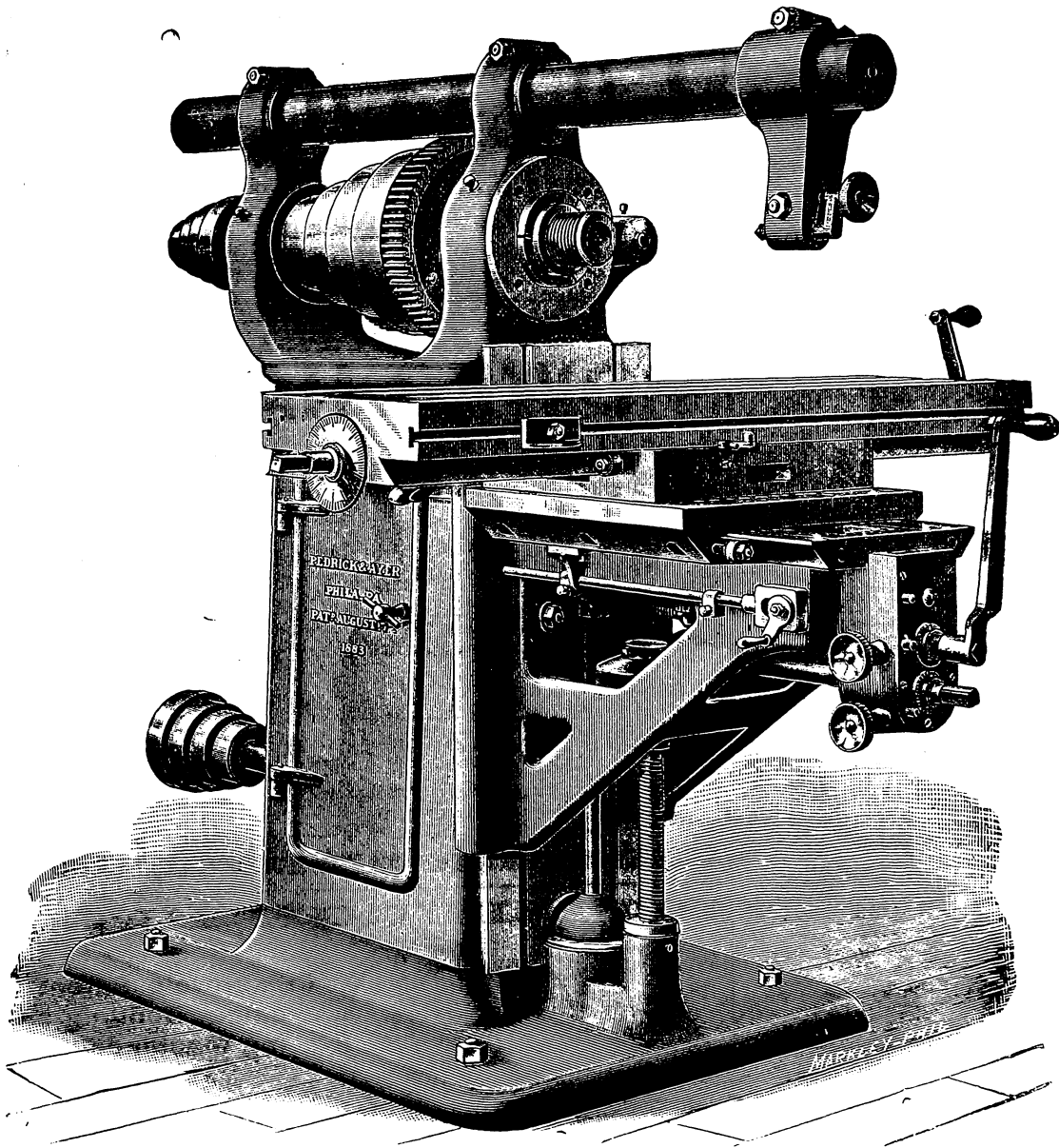
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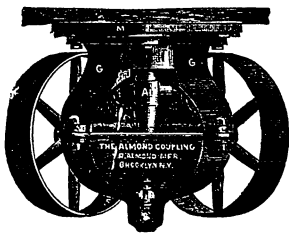
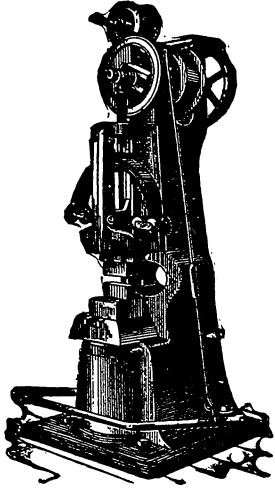
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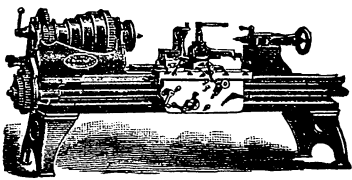
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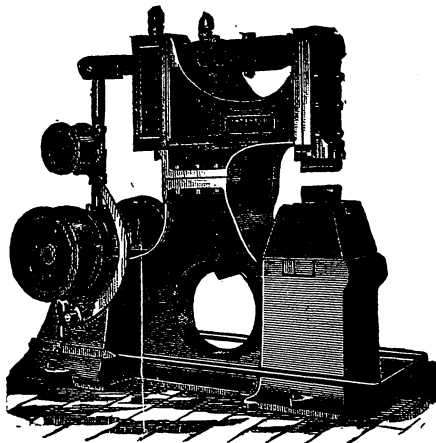
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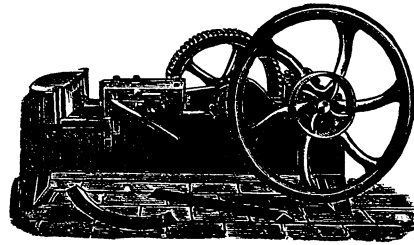
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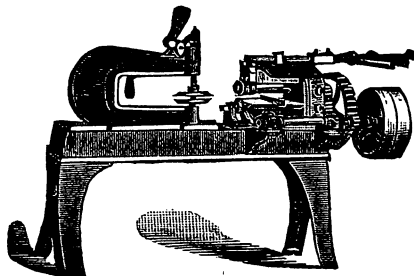
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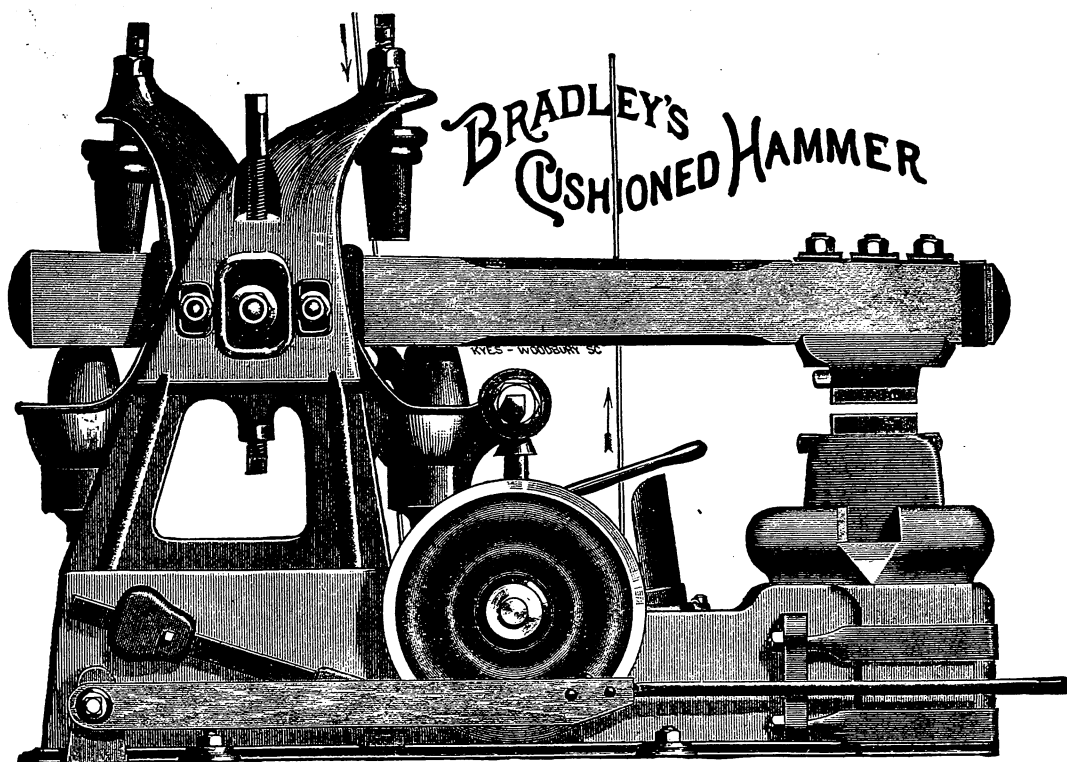
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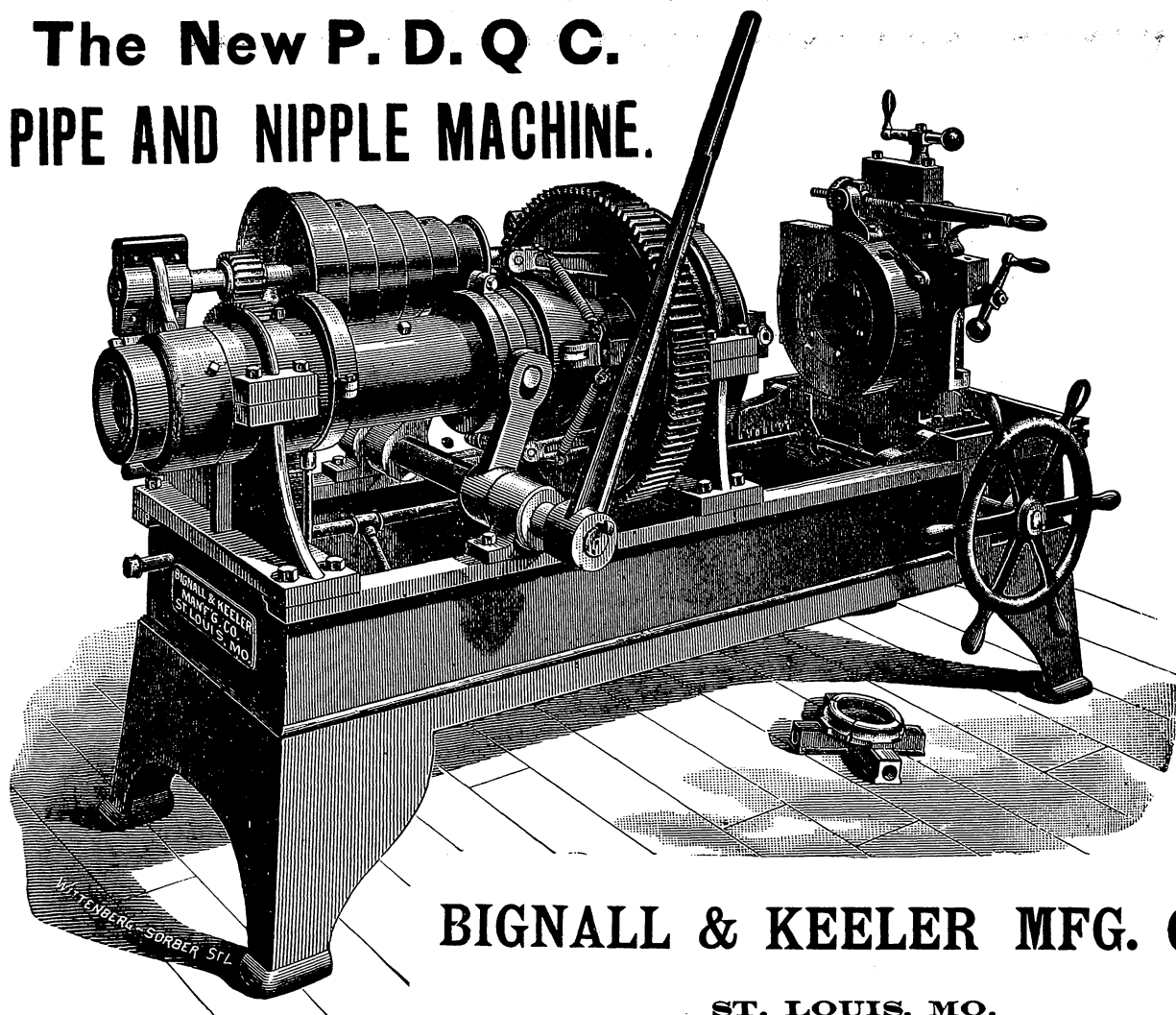
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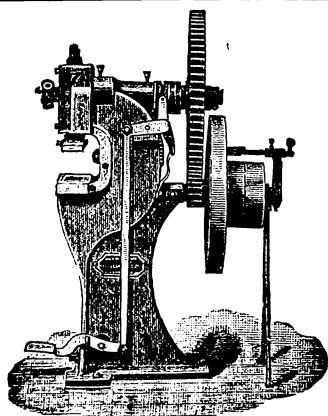


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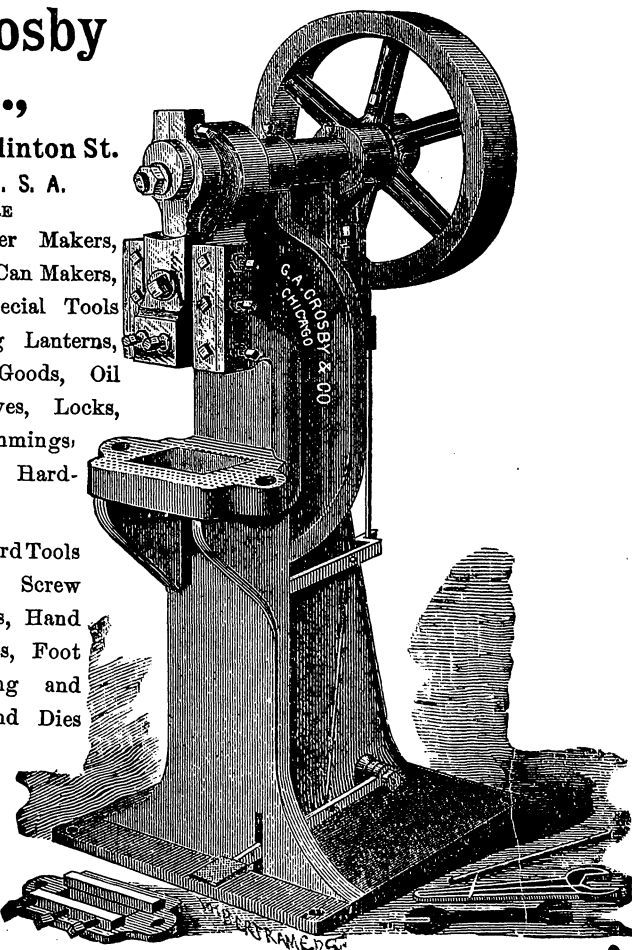
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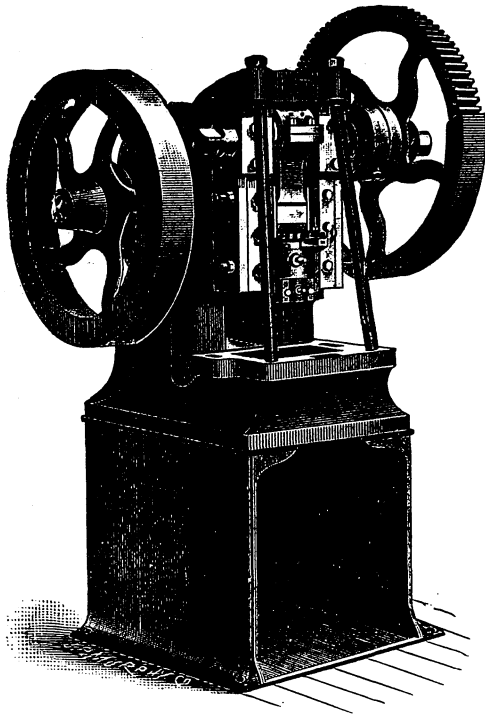
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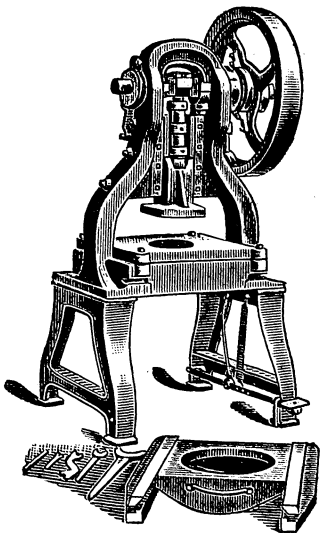
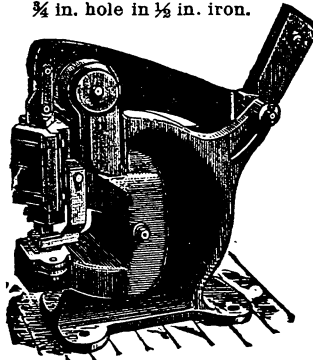
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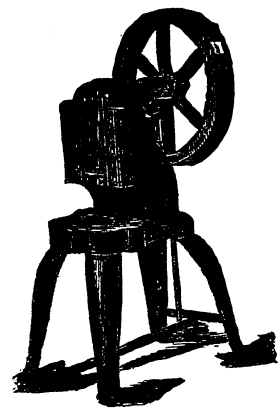
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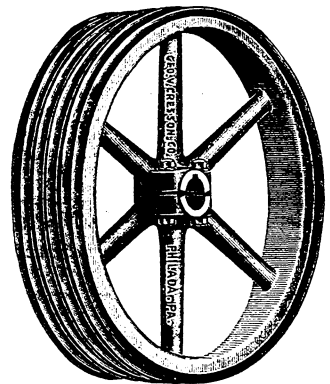
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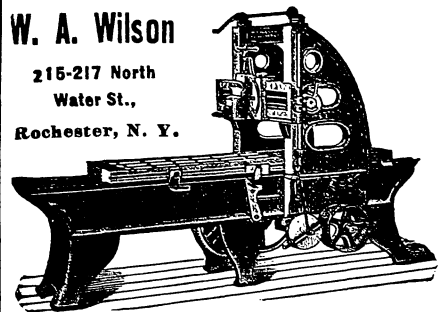
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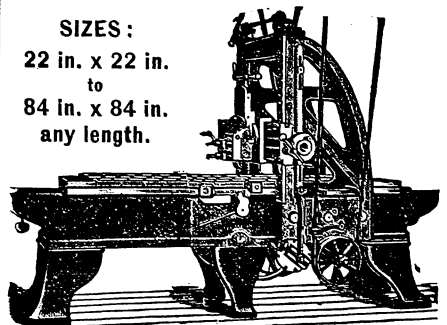
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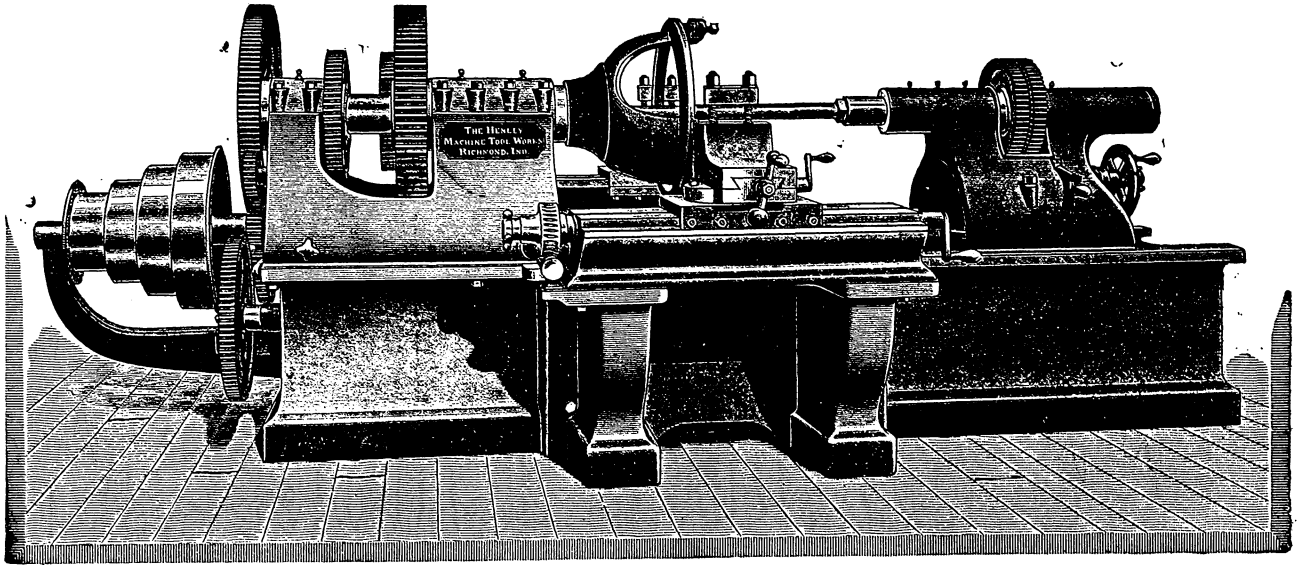
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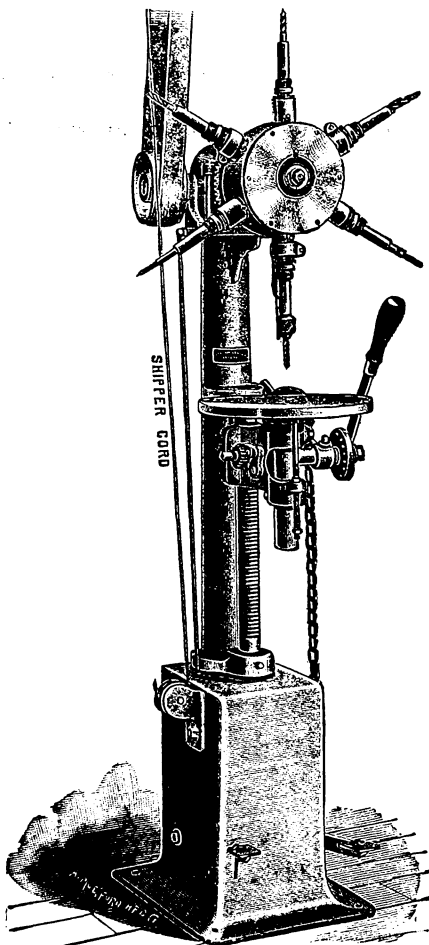
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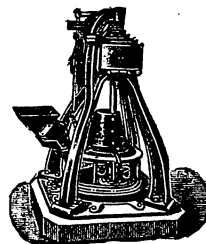
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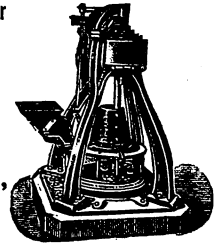


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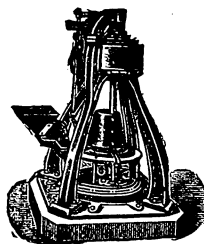


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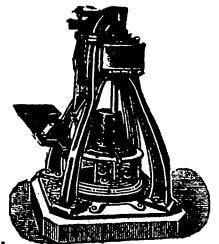


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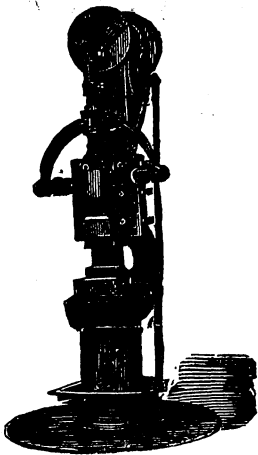


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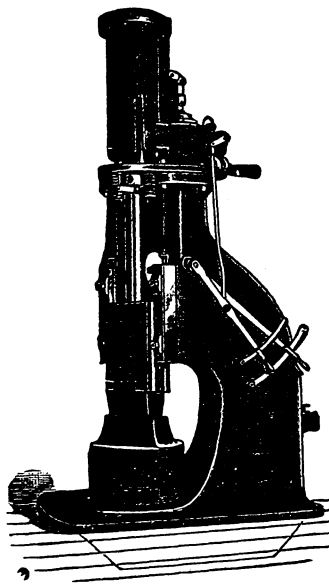
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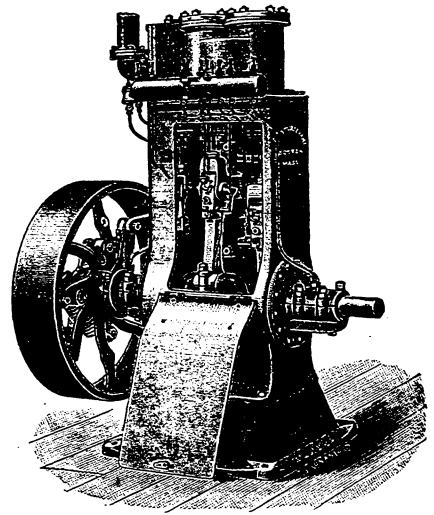
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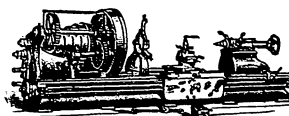
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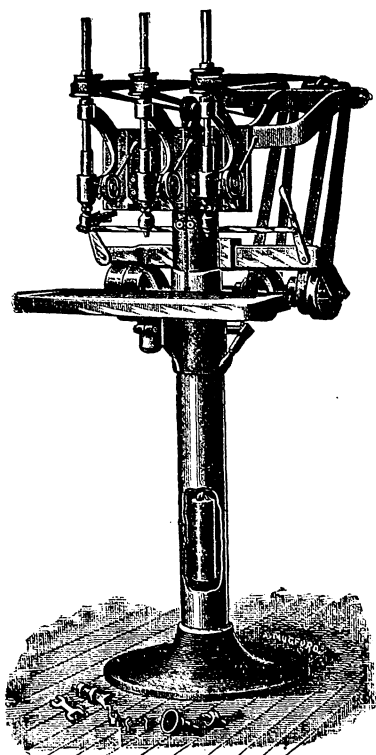
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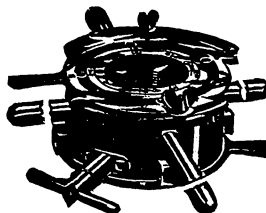
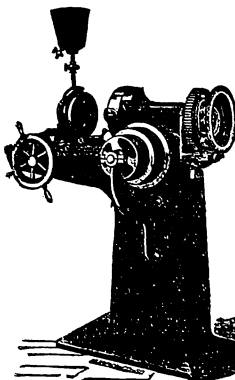
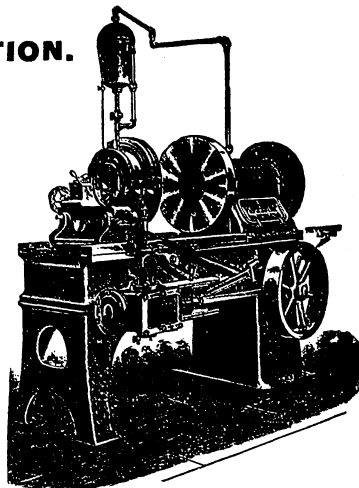
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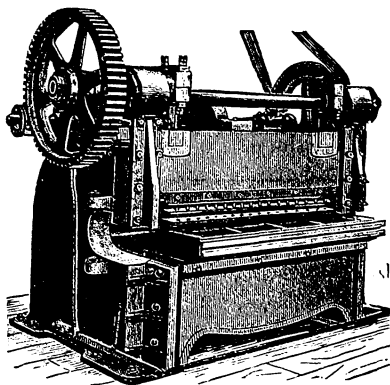
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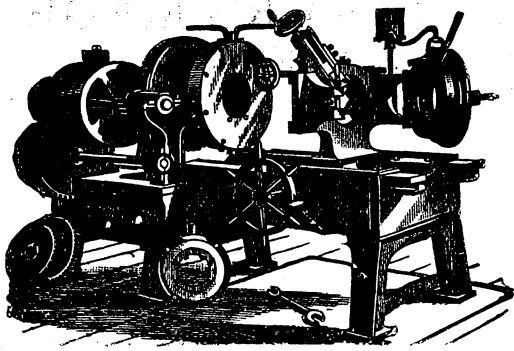
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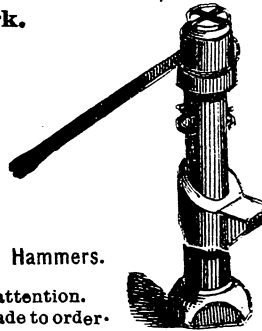
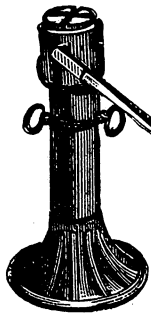
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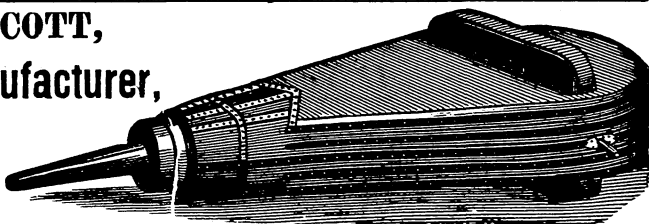
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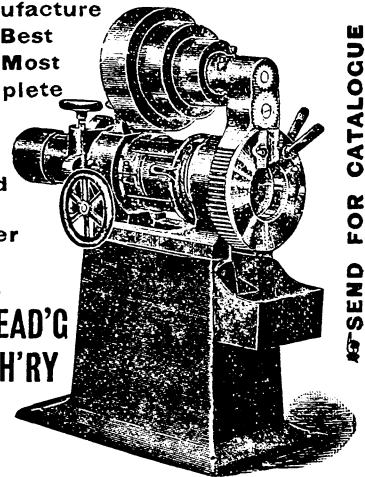
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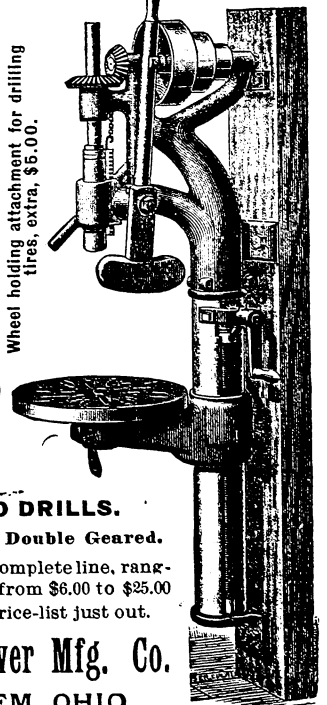
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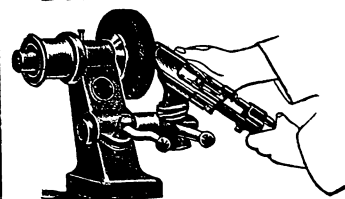
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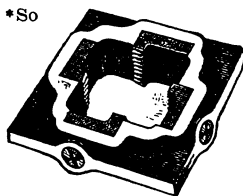
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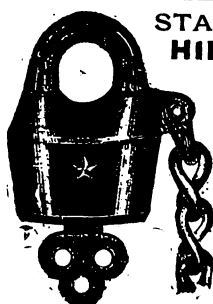
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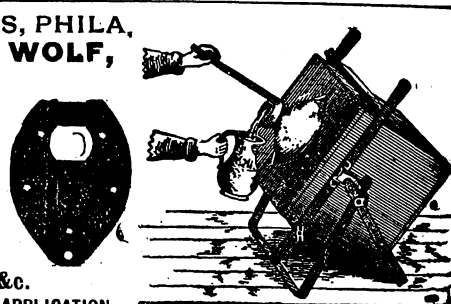
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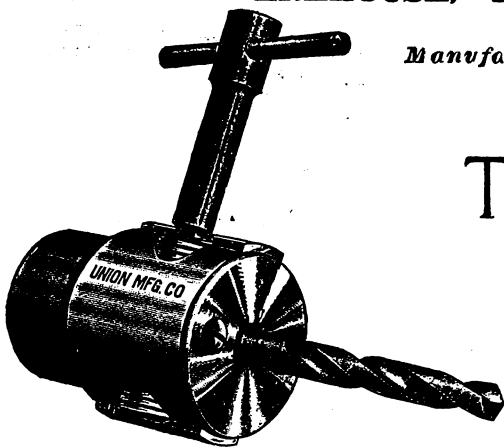
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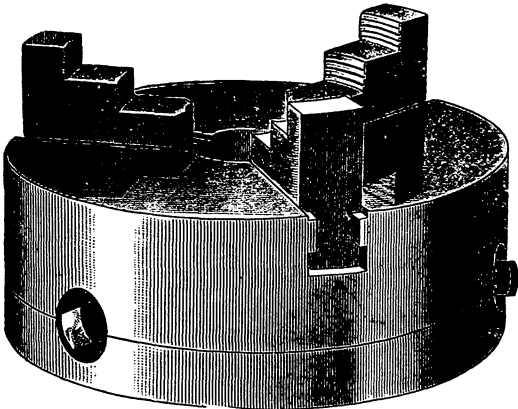
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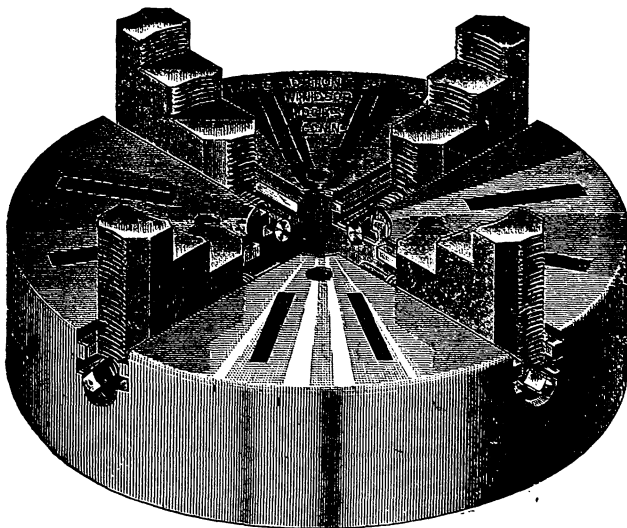
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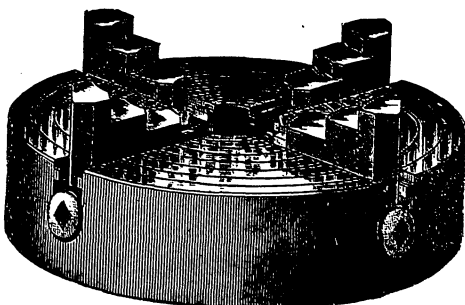


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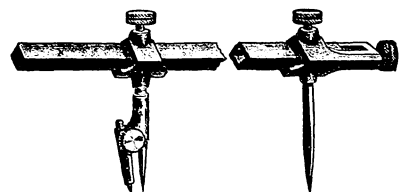


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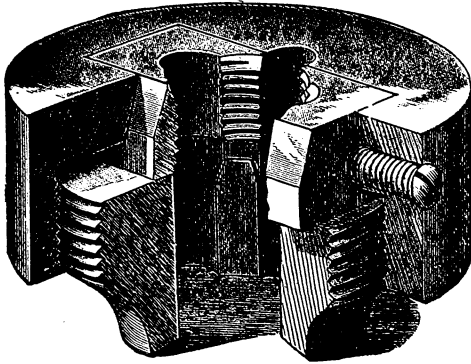
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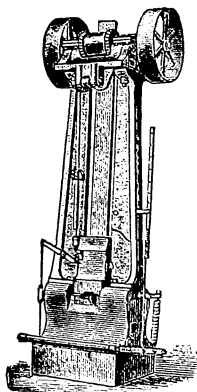
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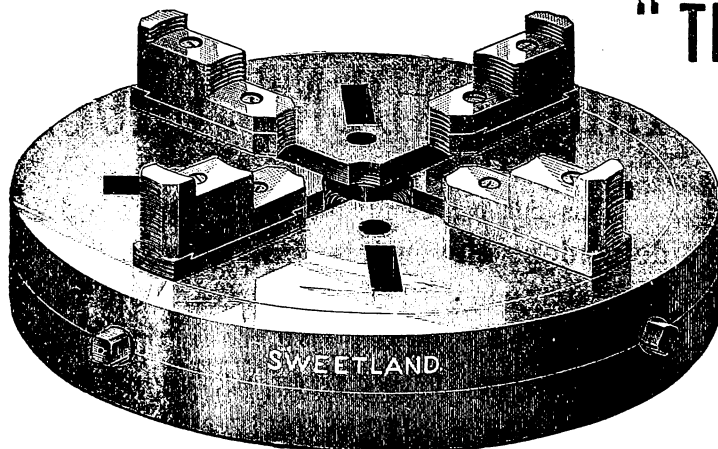
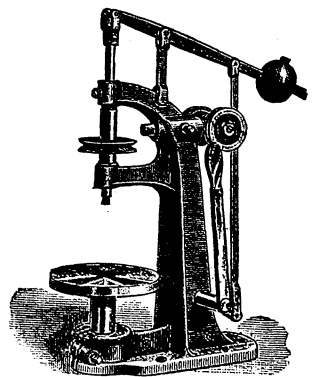
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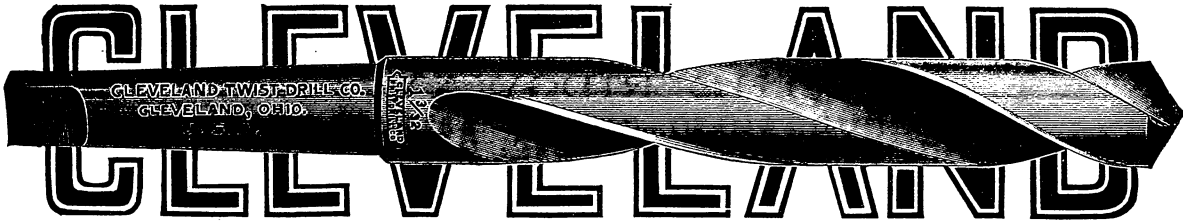
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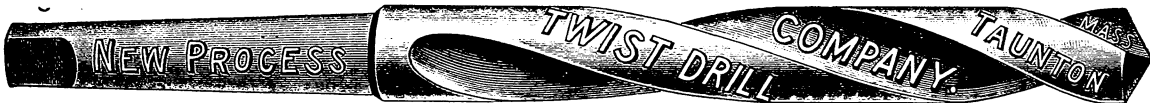
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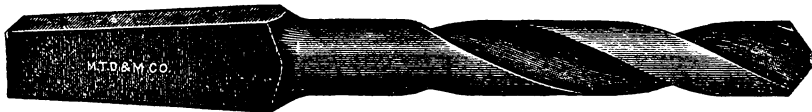
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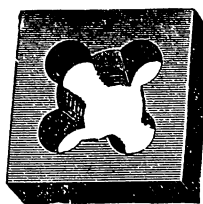
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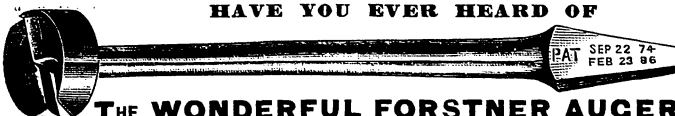
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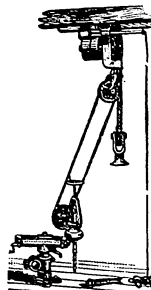
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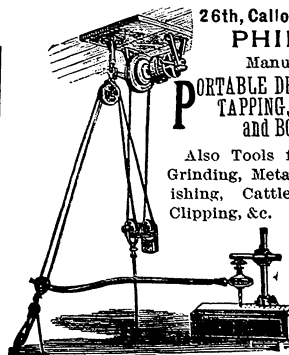
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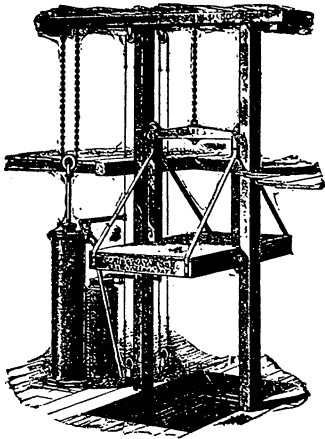
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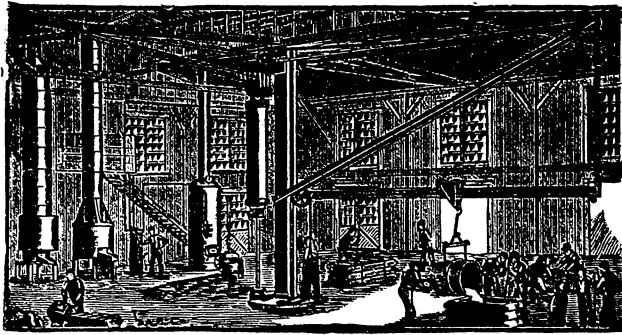
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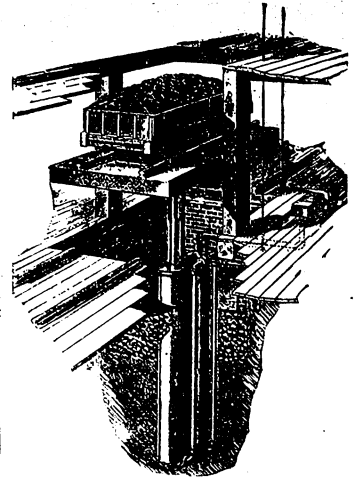




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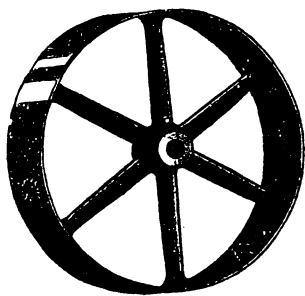
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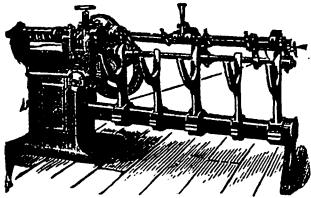
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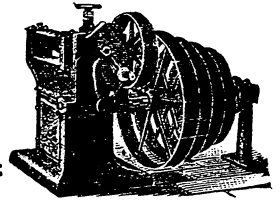
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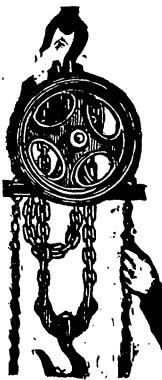
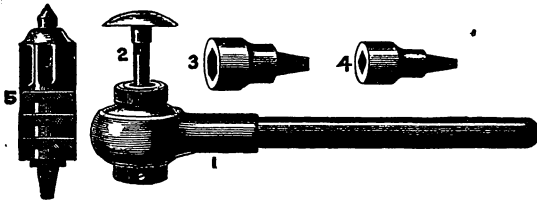
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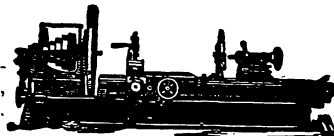
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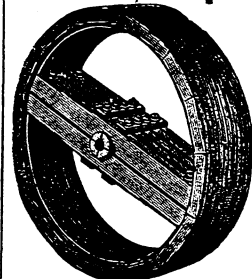
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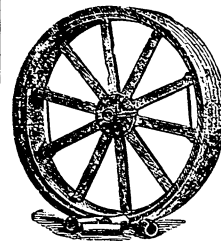
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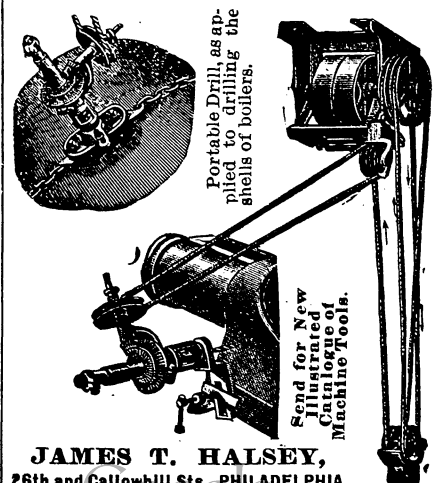
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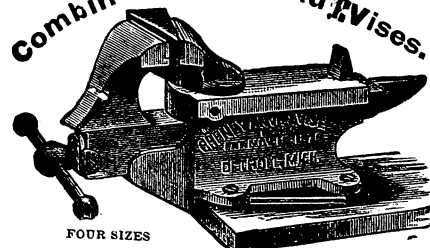


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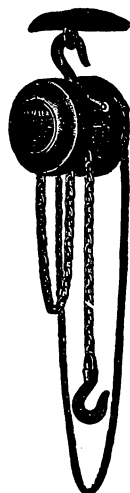
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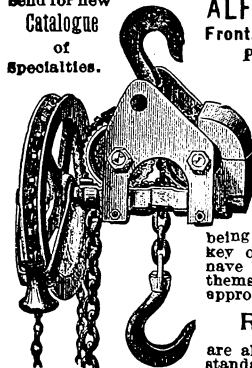


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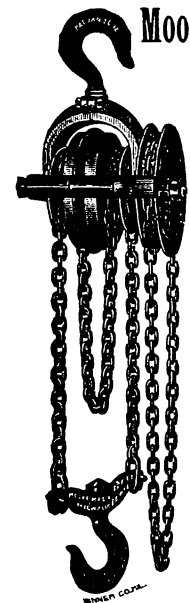


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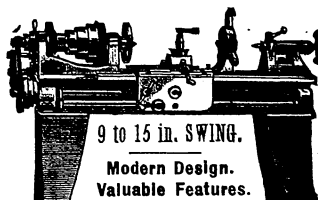
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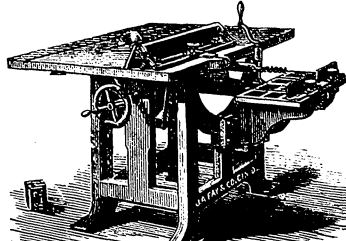
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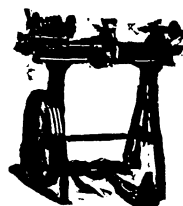
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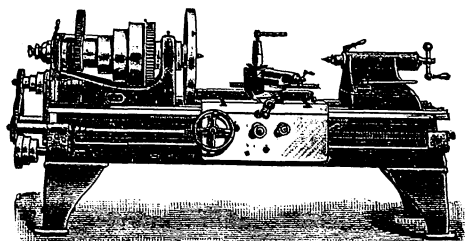
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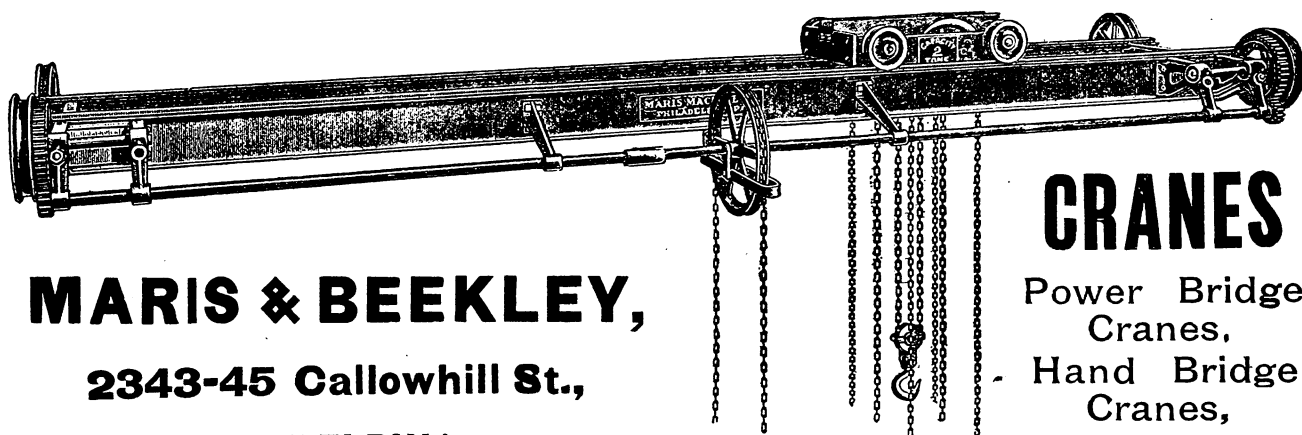
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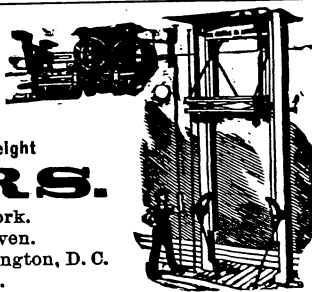
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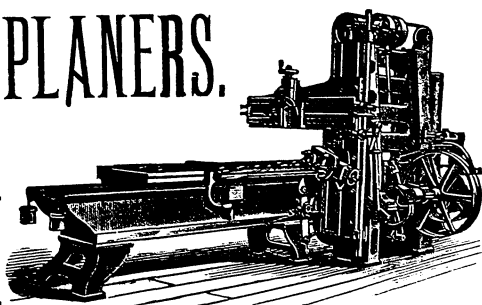
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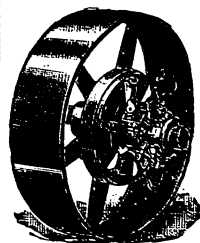
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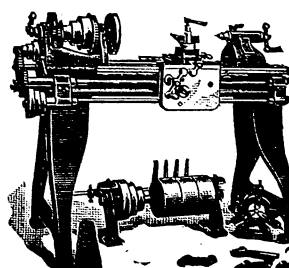


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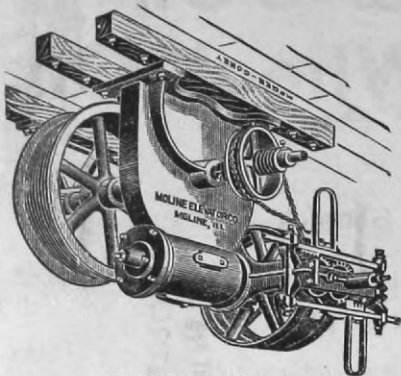


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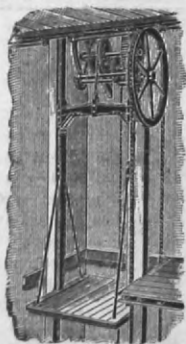
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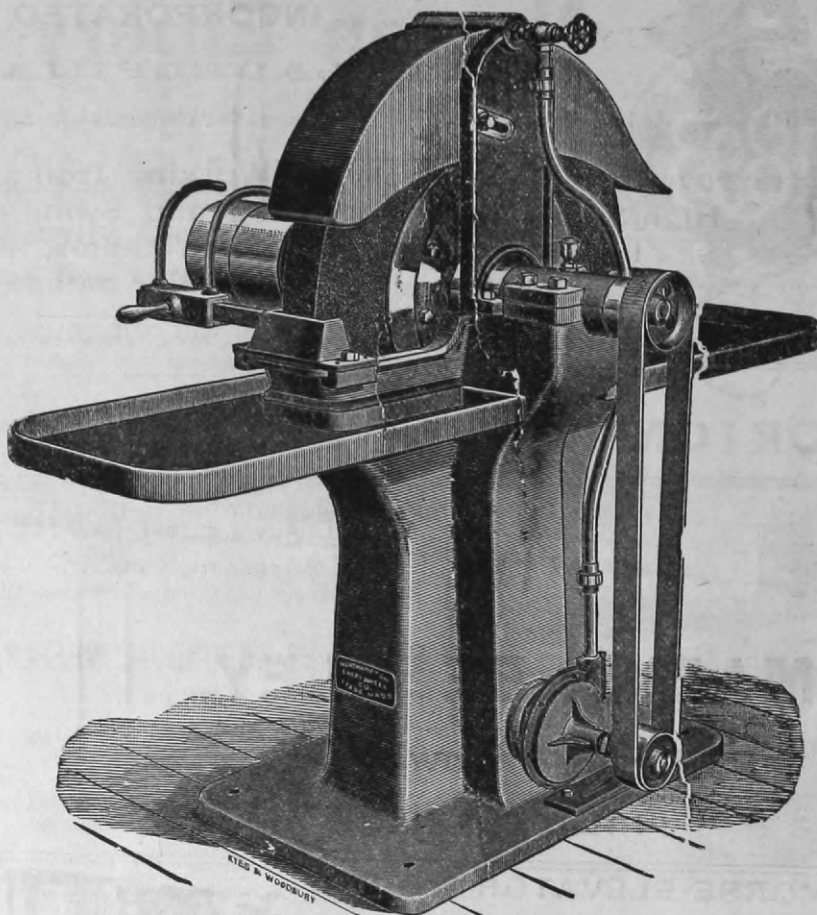


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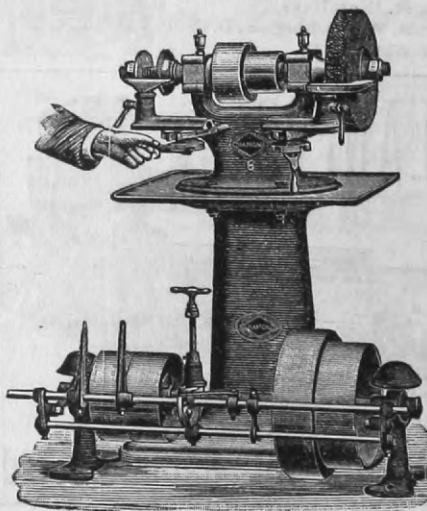
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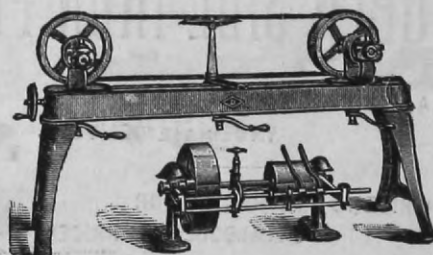
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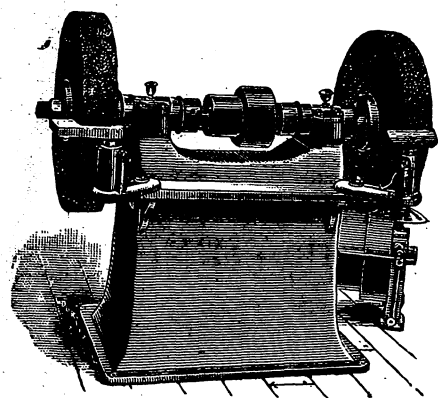
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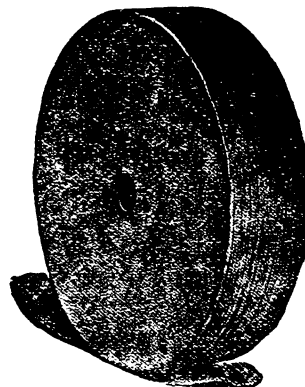
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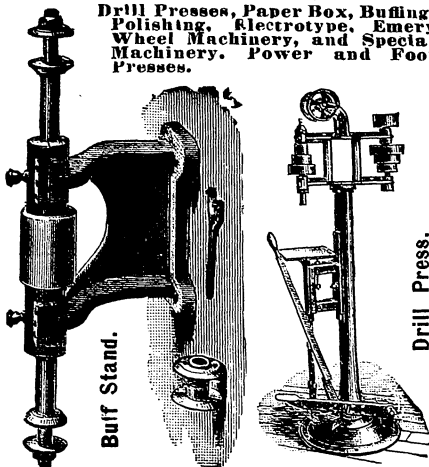
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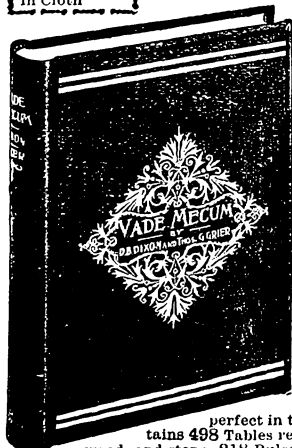
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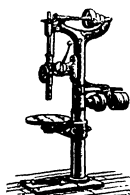
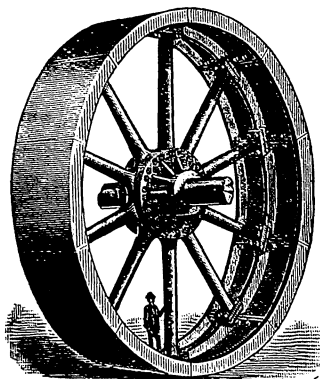
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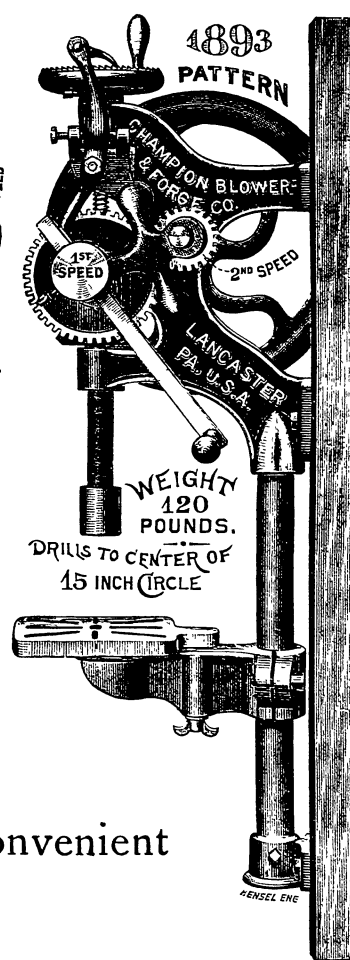
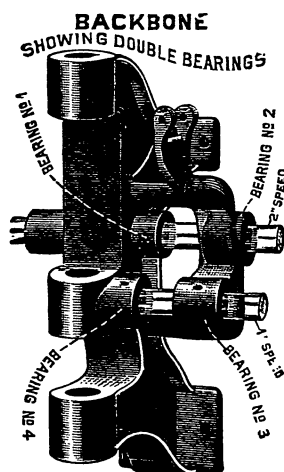
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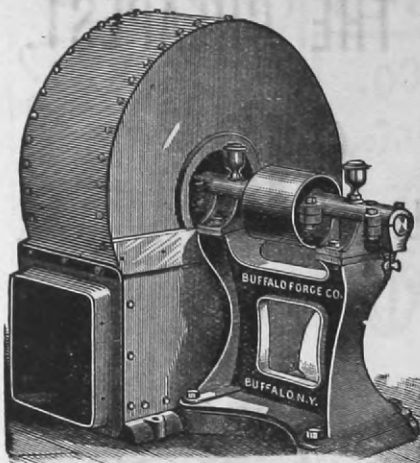
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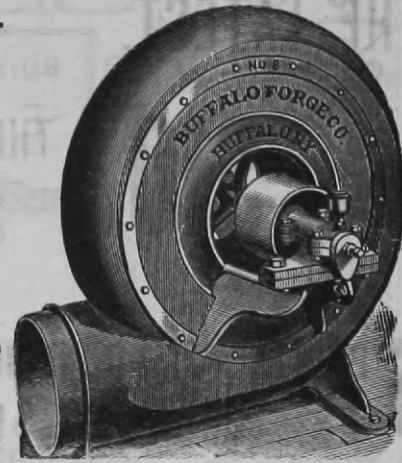
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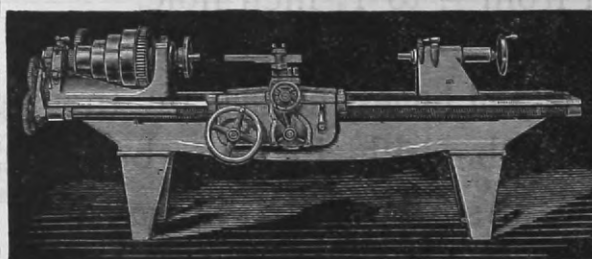


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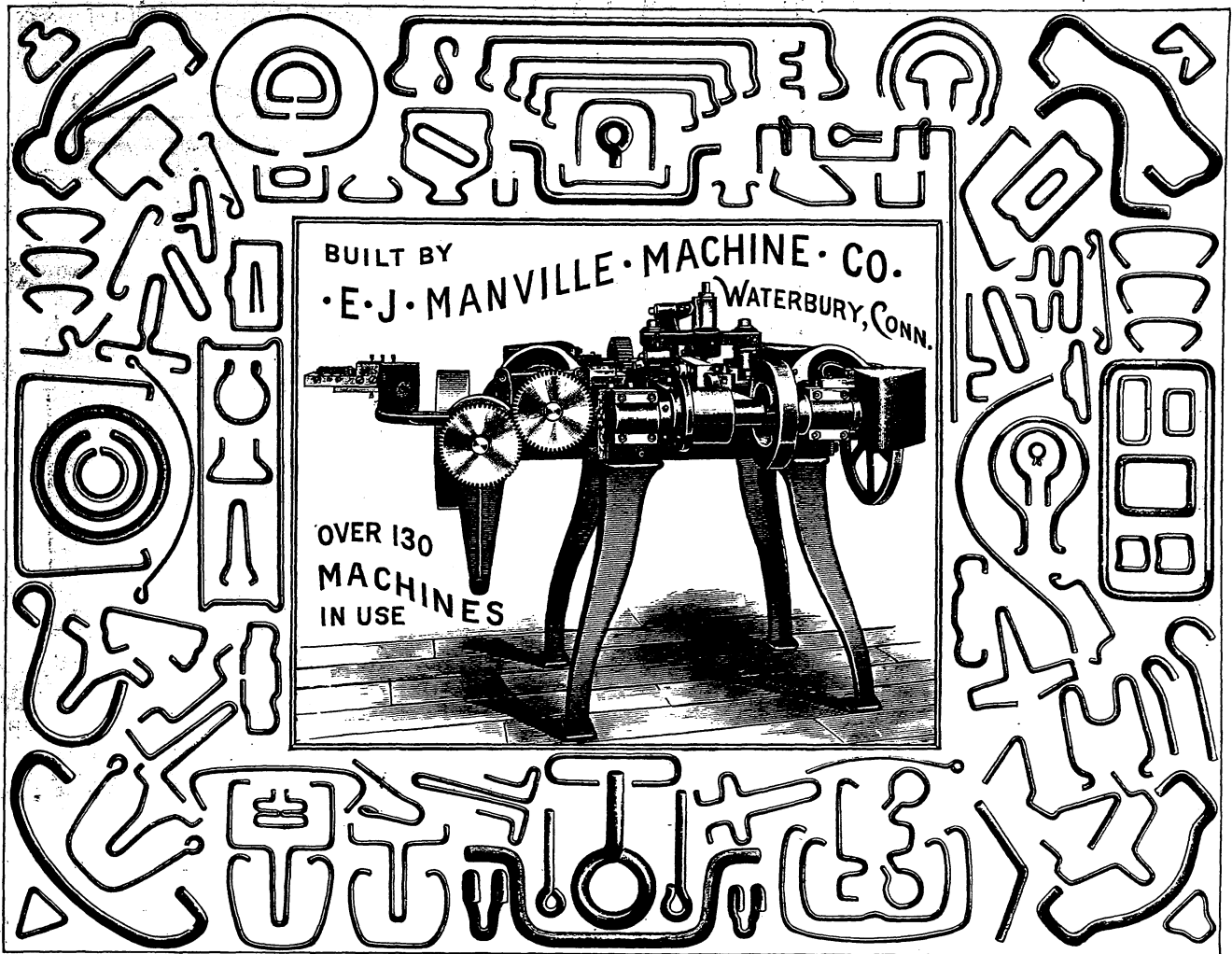
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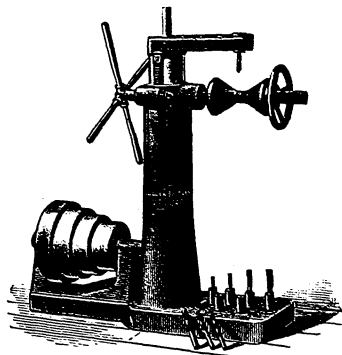
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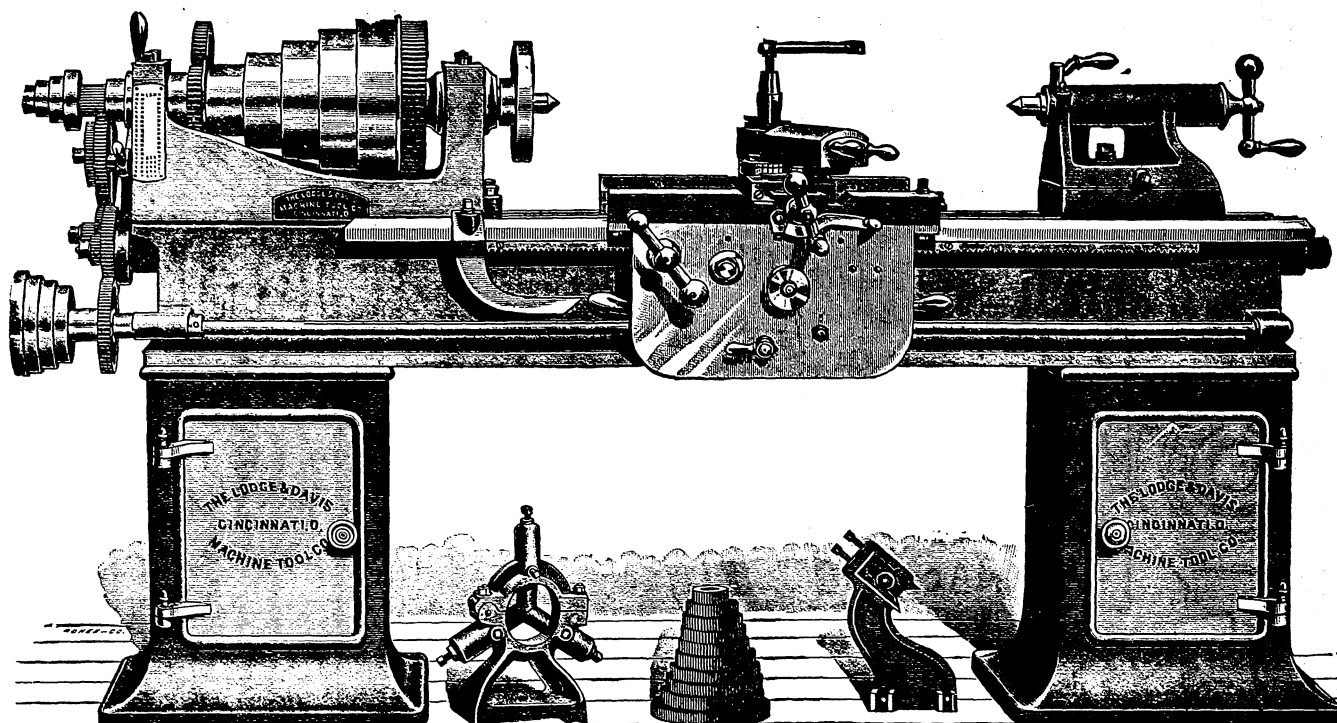


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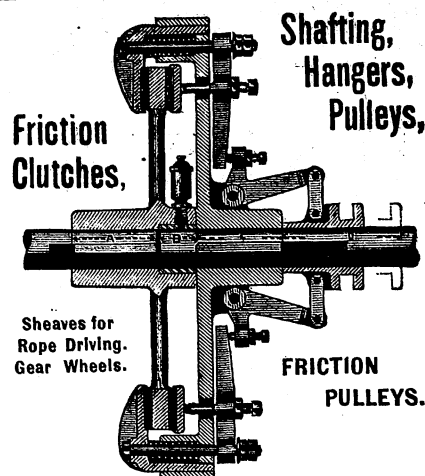
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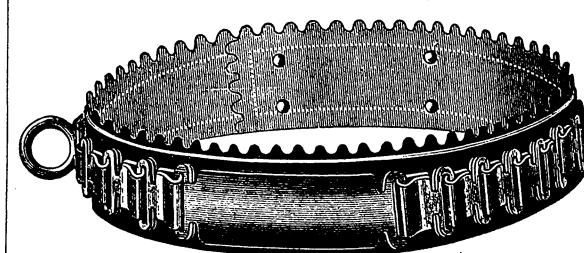
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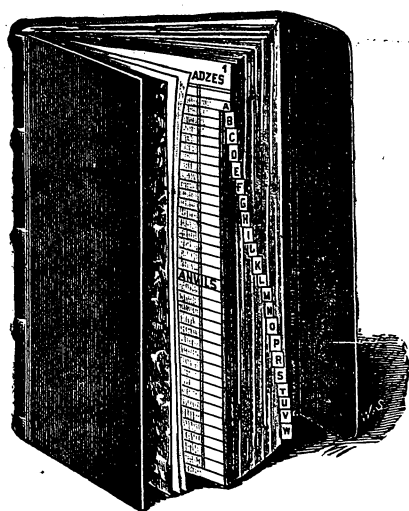
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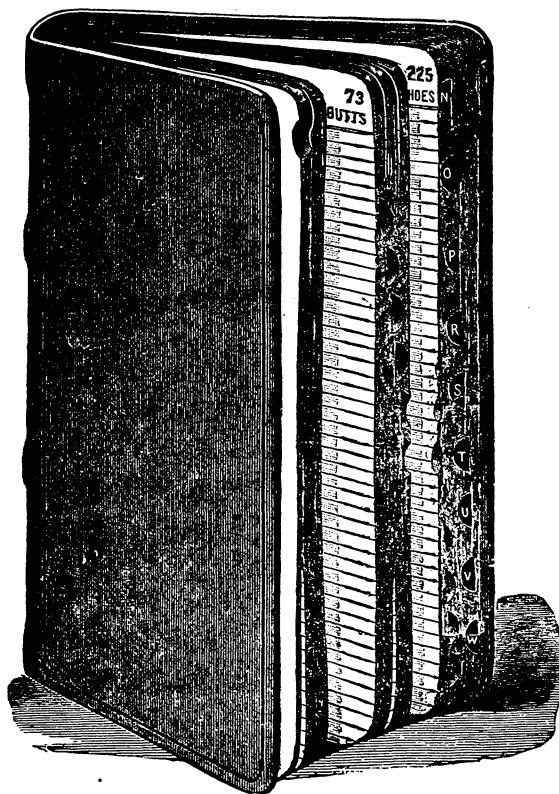
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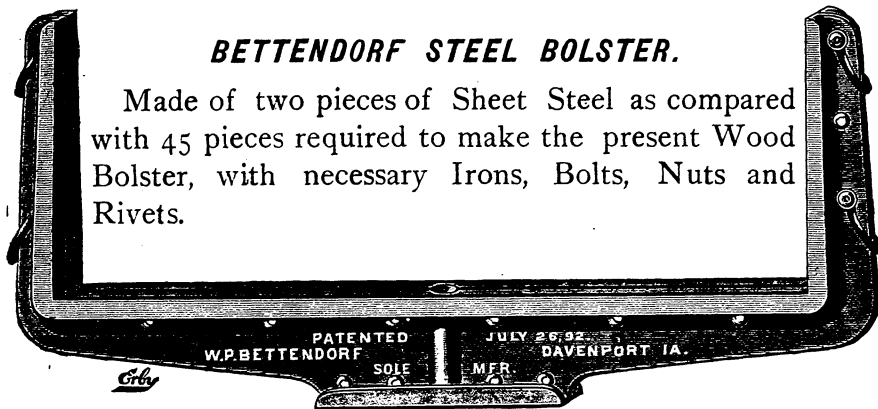
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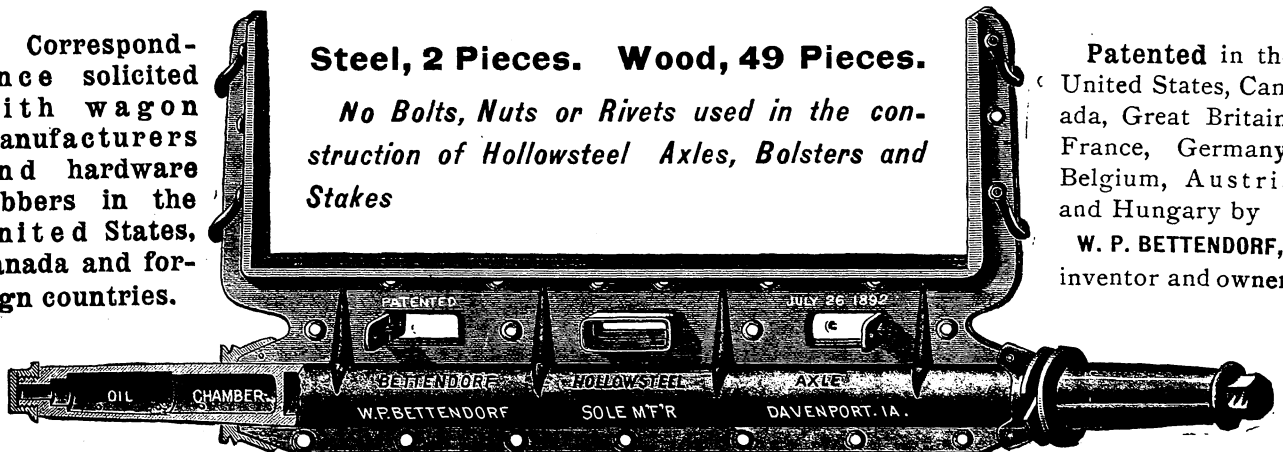
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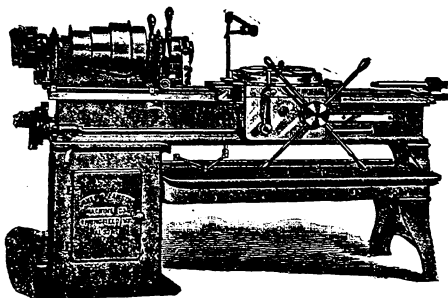
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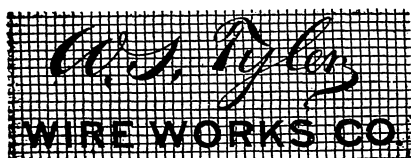
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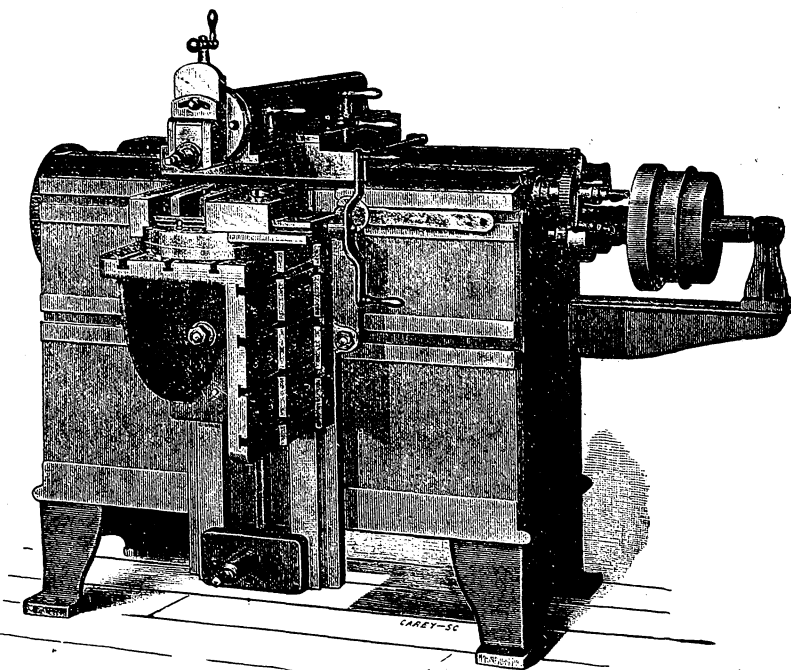
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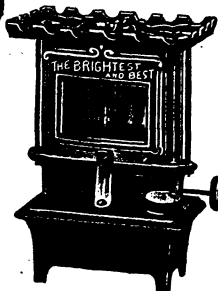
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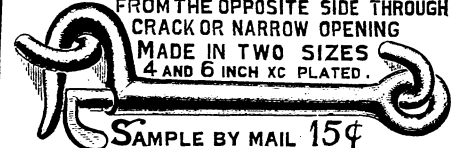
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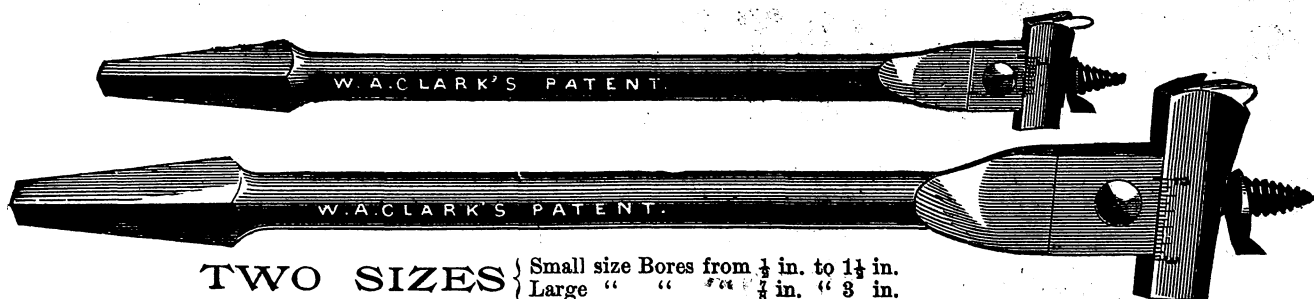
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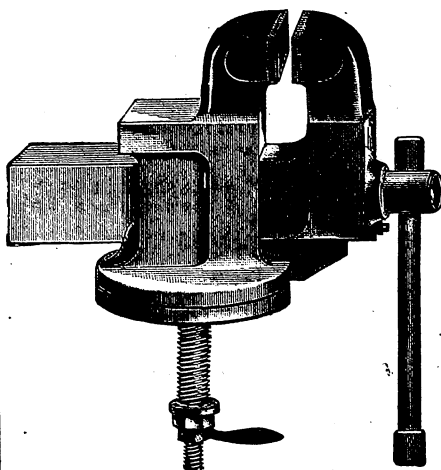
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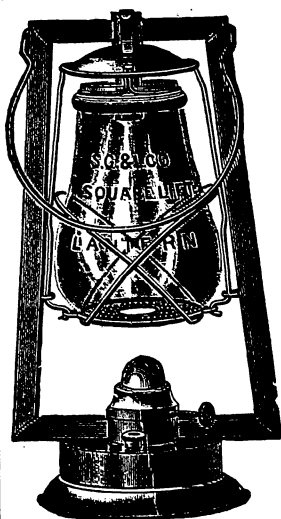
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THE WESTON CRANE COMPANY.

## Lessee, Branford Lock Works.

OFFICE AND WORKS, STAMFORD, CONN.

Ornamental Metal Work, Locks and Builders' Hardware for every purpose.

Catalogues and full information furnished on application at any of our houses.

NEW YORK.

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BOSTON.

84-86 Chambers Street. 152-154 Wabash Ave.

1120 Market St.

224 Franklin Street.

THE DEALER who sells what  
THE PEOPLE ask for.

MAKES FRIENDS and MONEY, and  
SAVES TIME and TROUBLE.

The people ask for

# LePage's Liquid Glue,

And the people are right.

It is the strongest and best glue made. It has been imitated, but never equalled. Be sure to get what you order and ACCEPT NO SUBSTITUTES.

Our name is on every label

## RUSSIA CEMENT CO.,

GLOUCESTER, MASS.

New York Office, 95 Reade and 113 Chambers Streets.  
Pacific Coast Office, 23 Davis Street, San Francisco, Cal.

## STEEL RULES, HARDENED ENDS.

Also a full line of

## MACHINISTS' FINE TOOLS.

If you haven't our 1893 catalog send us a postal card.

## STANDARD TOOL CO.,

ATHOL, MASS., U. S. A.

ATHOL MACHINE CO., Selling Agents.

**IT PAYS.** Nothing about a Hardware Store looks so well as clean shelves and the goods neatly boxed with a fresh sample on the front. Customers are attracted by such a display of care, and notice and buy things that would ordinarily go without notice. The Boxes are inexpensive, save the goods, make a big show for a small investment and help the salesmen. Send to

**JESSE JONES & CO., Philadelphia**  
for Catalogue of prices, styles and references.

Palmer's Common Sense Frame Pulley



MANUFACTURED BY

PALMER HARDWARE MFG. CO., Troy, Y. N.

## ELIZABETHPORT CORDAGE CO.

Manufacturers of

# ROPE AND BINDER TWINE,

46 South Street, New York.

# W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.

THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

## Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

## DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

A LARGE CAPACITY, AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries,

Fig. 190.

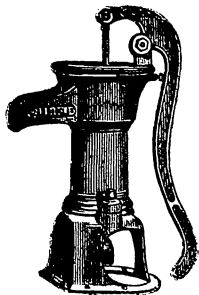
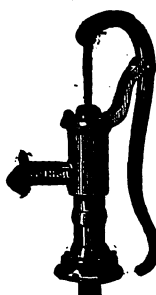


Fig. 76.



or wherever it is desired to raise a large quantity of water by hand power.

The pump has large valves (accessible by hand) and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

Capacity from 3,000 to 4,500 gallons per hour.

These pumps are simple, durable and low priced.

Made either as shown in cut for Hose or for IRON Pipe Suction underneath.

Send for Circular and Price List.

Fig. 202.

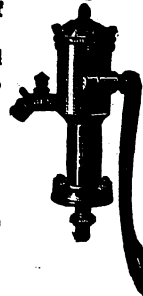


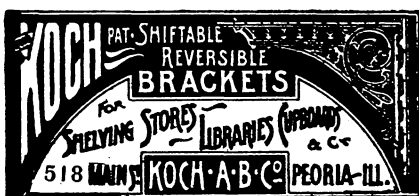
Fig. 381



## F.E. MYERS & BRO.



Ashland Pump and Hay Tool Works.



## TRIVERS BROS. CO.,

— MANUFACTURERS OF —

PURE MANILA AND SISAL

## ROPE.

MANILA, SISAL AND MIXED

## BINDER TWINE.

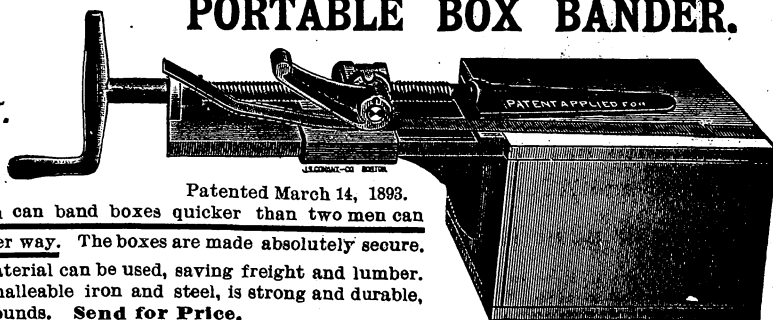
Mexican Hammocks, Hammock Attachments, Peerless Sash Cords, Hardware Twines, Agts. Silver Lake Sash Cords.

Office, 107 Duane St.

16 Thomas St., N. Y.

SOON  
PAYS  
FOR  
ITSELF.

## PORTABLE BOX BANDER.



Patented March 14, 1893.

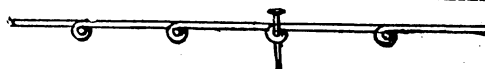
One man can band boxes quicker than two men can in any other way. The boxes are made absolutely secure. Lighter material can be used, saving freight and lumber. Made of malleable iron and steel, is strong and durable, weighs 8 pounds. Send for Price.

J. W. GOODELL, Manufacturer,

BURLINGTON, VT.

## Lightning Band for Cases and Crates.

(COVERED BY U. S. LETTERS PATENT.)



Mounted on reels and always ready for use and convenient to handle. Easily and quickly binds shipping cases and crates in a neat, strong and substantial manner.

PRICES:

No. 1, per reel of 2000 ft., \$4.50 net.  
No. 2, per reel of 2000 ft., \$4.75 net.  
Pliers for cutting wire, 50 cents extra.  
No. 1 for cases under 300 or 400 pounds, and No. 2 for all heavier cases.

Buffalo Specialty Mfg. Co.  
Sole Manufacturers,  
Buffalo N. Y., U. S. A.

## NONPAREIL Ratchet Wrenches.

Made of best forged Tool Steel; are easily and readily adjusted and controlled. Can be made reversible instantly without removing from their work by throwing over the lever in slot of the handle.

The Set of Combination Tools No. 1 includes the wrench, two sockets, one for screw-driver, bit or reamer shank, with wood handle, and one socket

for drill shank and feed nut. The jaws on this wrench open from 3-16 to 1 1/4 inches.

Send for Illustrated Circular and Price-list of various sizes

The Keystone Mfg. Co.

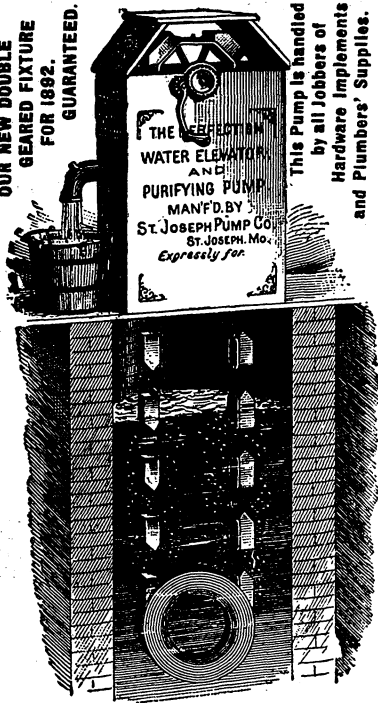
312 Terrace, Buffalo, N. Y.



Experienced Agents Wanted.



OUR NEW DOUBLE  
GEARED FIXTURE  
FOR 1892.  
GUARANTEED.



# EVERYBODY

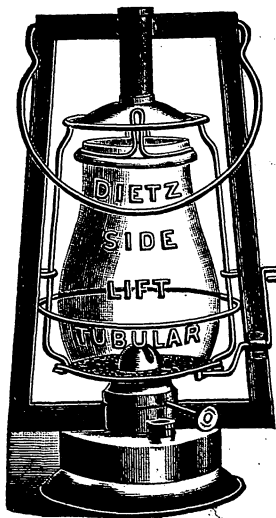
is invited to call on us  
in Agricultural Hall of  
the Great World's Co-  
lumbian Exposition.

Don't call only once,  
but as often as you can.  
We will be pleased to  
see all our friends.

**ST. JOSEPH PUMP CO.,**

ST. JOSEPH, MO., U. S. A.

E. A. KING, Sec'y and Gen'l Manager.



ESTABLISHED 1840.

## A WORD TO THE WISE IS SUFFICIENT

When you purchase a Lantern, Street Lamp  
or Driving Lamp, remember the

### "DIETZ" Make

is the best. Our goods have stood the test  
of time and are safe and reliable. The name  
"DIETZ" is plainly stamped on them. Our  
specialty is Tubular Lanterns, Street Lamps  
and Driving Lamps. We make a large variety  
being the oldest and largest house in our line.

**ASK FOR THEM!**

**R. E. DIETZ COMPANY,**

New York, 60 Lighthouse St. U. S. A. Chicago, 25 Lake St.

## BINGHAM PATENT VISE JAW CAP

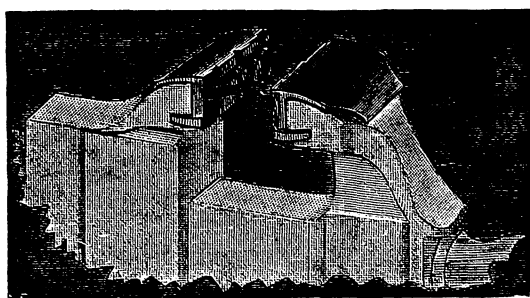
Will Fit any Kind of Vise.

For protecting finished work. Will  
hold finished rods of any shape without  
injury.

3 1/4 inch, .....	per pair, 40 cents.
4 " .....	" 50 "
4 3/4 " .....	" 60 "

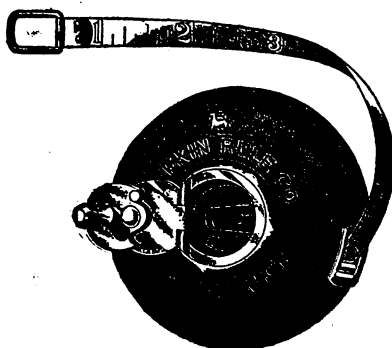
**PRENTISS VISE CO**

44 Barclay St., New York.

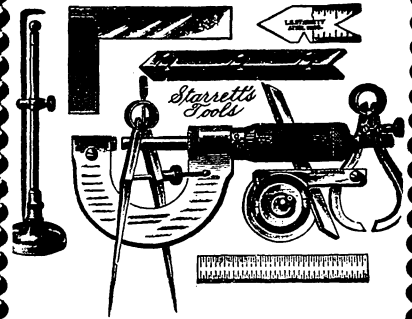


## "RELIABLE" Steel Measuring Tapes.

Entirely new. Handle or crank when closed  
is perfectly flush with leather case. Opens by  
pressing button on opposite side and folds out  
double, giving increased leverage. Best and  
most convenient steel tape on the market.  
Fully guaranteed. Will send samples on ap-  
proval.



**LUFKIN RULE CO., Saginaw, Mich.**



## Skilled Mechanics

want tools that are warranted  
accurate, best in workmanship,  
latest in design, finest in finish.

## Live Dealers

want tools they can swear by,  
not at. That can be relied upon  
to satisfy intelligent customers.  
That come nicely put up. That  
pay a good profit.

## Starrett's Tools

meet the requirements of both.

SEND FOR CATALOGUE.

**L. S. STARRETT**

Athol, Mass., U. S. A.

LONDON AGENTS: Chas. Churchill & Co., Ltd.,  
21 Cross St., Finsbury, E. C.

## A NEW CHAIN PUMP

**KEBLER'S PATENT -**  
Galvanized Iron Tubing  
FOR CHAIN PUMP.  
Is guaranteed to be  
**THE BEST.**

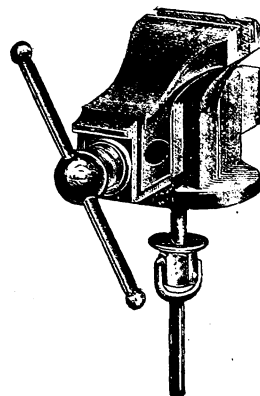
IT is made of best quality Gal-  
vanized Iron, which will not  
rust nor accumulate filth.  
IT only weighs one-half pound to  
the foot, wet or dry, while  
wood tubing saturated with  
water weighs six pounds or  
more per foot.  
IT will last longer than wood  
tubing.  
IT will not freeze in any climate.  
IT can be attached to any make  
of curb.

We also manufacture a Gal-  
vanized (all) Iron Curb. Address

**BELLEVUE PUMP CO.,**

Sole Mfrs., BELLEVUE, IOWA.

OR **A. F. SHAPLEIGH HDW. CO., St. Louis.**  
Agents for Southern Territory.



**HOLLANDS'  
OFFSET JAW  
VISE.**

Specially adapted  
for drill press work  
where chucks can-  
not be used and  
equally good for  
special or regular  
bench work.

**Hollands Mfg. Co.,  
ERIE, PA.,  
Manufacturers all  
styles VISES**

# THE DEMING CO., SALEM, O.,

New York Office  
72 John St.

MANUFACTURERS OF THE LARGEST AND MOST COMPLETE LINE OF

## SPRAY PUMPS, NOZZLES and APPLIANCES

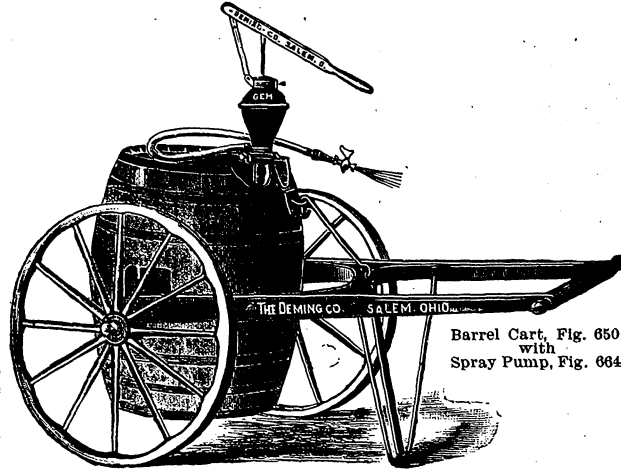
IN THE MARKET.

Also HAND and POWER PUMPS (Iron and Brass), WORKING BARRELS, for deep and shallow wells, HYDRAULIC RAMS, Etc.

Fig. 549.



HENION & HUBBELL, Gen'l Western Agts.,  
55 & 57 N. Clinton St., Chicago, Ill.  
SELIG SONNENTHAL & CO., European Agts.,  
85 Queen Victoria St., London Eng.



Barrel Cart, Fig. 650,  
with  
Spray Pump, Fig. 664.

Fig. 655.

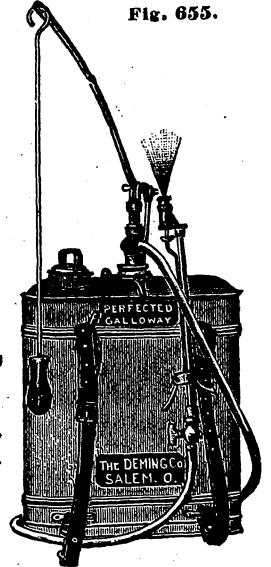


Fig. 571.

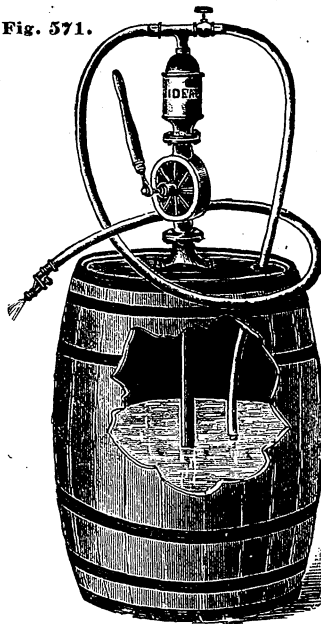


Fig. 516.

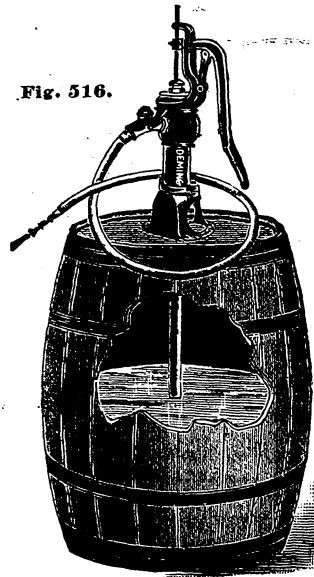


Fig. 550.  
(Cut showing Outfit "C.")

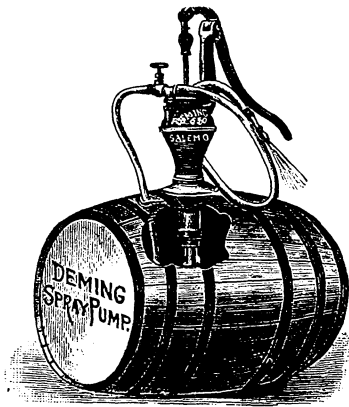


Fig. 553.

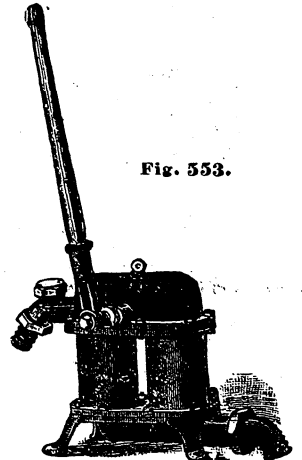


Fig. 631.

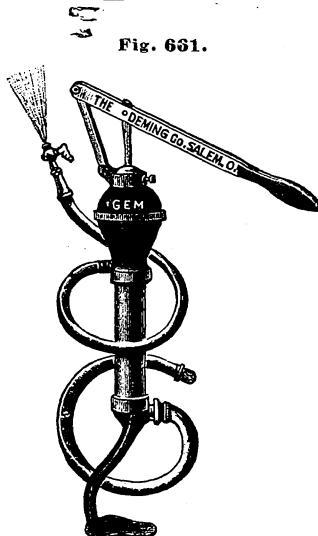


Fig. 962.

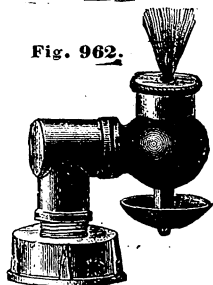


Fig. 662.

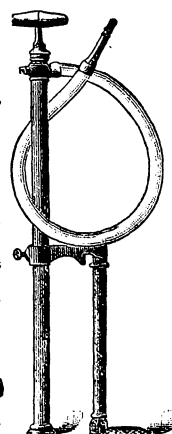


Fig. 963.



Fig. 663.

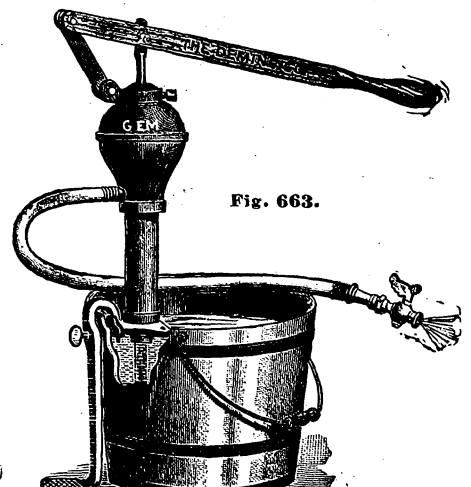


Fig. 959.

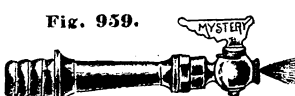


Fig. 960.

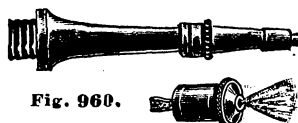


Fig. 949.



Spray Pipe Extension, Fig. 970.  
Length, 8 feet, in 2 sections.

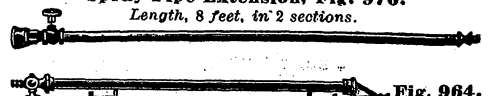
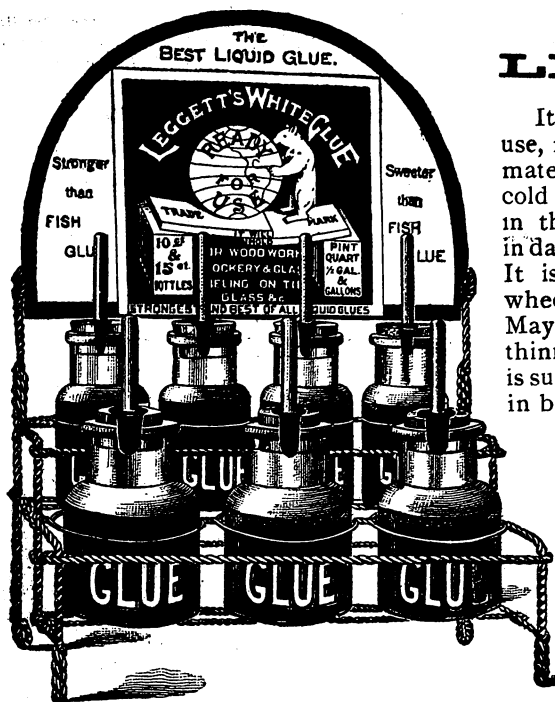


Fig. 964.

WRITE FOR NEW CATALOGUE AND PRICES OF SPRAY PUMPS, NOZZLES AND APPLIANCES.



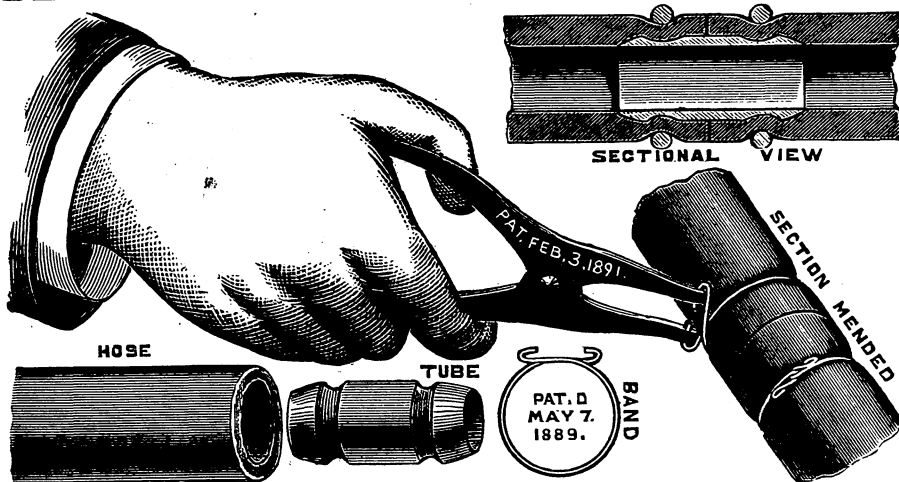
## LEGGETT'S LIQUID WHITE GLUE.

It has many advantages over other liquid glues. Always ready for use, may be thinned with water without injury, will keep in any climate, never spoils and has no unpleasant odor; it does not thicken in cold or become thin in warm weather and is not affected by changes in the atmosphere. Articles mended will not fall apart in damp weather, as is often the case when fish glue is used. It is particularly adapted for wood work, carriages, emery wheels, belting, &c. Will mend crockery and glass. May be used for labeling on tin or glass by slightly thinning with water. It does not wrinkle paper and is superior to mucilage for pasting bills, scraps, &c., in books. The corks with brush attached are prepared so they will not stick to the glass or tin, making package easy to open and close and more convenient than the ordinary can or bottle in use. 1 and 2 oz. bottles, 4 oz., 1/2 pint and pint cans have brush attached. Quart, 1/2 gal. and gal. cans with patent double covers. Wire stand furnished.



LEGGETT & BRO., 301 Pearl St. N. Y.

## HUDSON'S GARDEN HOSE MENDER.



Put up in Boxes for Family Use.

Each Box Contains 1 Pair Pliers, 6 Tubes, 20 Bands.

Hose can be mended or Couplings fastened on

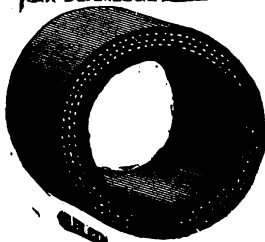
**CHEAPER,  
QUICKER and  
MORE SECURELY**

than with any other device.

Screw menders tear the rubber lining from the hose. OURS will not. If you wish to handle a good thing with a good profit, write for circular and prices.

**C. E. HUDSON & CO.,**  
LEOMINSTER, - - - MASS.

NEW SEAMLESS TUBE



## Who Has Not Had Bad Hose?

Who has not lost time, patience, money, by attempting settlement for such goods?

**THE CAUSE** in nine cases out of ten is the lapped seam.  
**THE REMEDY** is in buying our

### PATENT SEAMLESS-TUBE HOSE,

made by machinery, the tube run like lead pipe, through a die. There is no lapped tube, no seam, no cracks, no defects: water cannot get through to rot the duck and cause the hose to burst.

Made in All Sizes and Kinds of Garden, Engine, Steam, Fire, Brewers' Cotton Hose, &c.

Order a Sample Bale of our Seamless-Tube Hose—Best in the World, costs no more than ordinary lapped-seam hose. The different colors, Red, White, Black, Green and Yellow, make a fine window or sidewalk attraction.

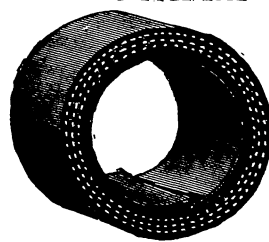
## CLEVELAND RUBBER WORKS

of the Mechanical Rubber Co.

CLEVELAND, O.,

Makers of Mechanical Rubber Goods, Clothing, Druggist Sundries, Specialties, Etc.

OLD LAPPED TUBE



**SALES OF**  
Over Two Million Feet

—OF—  
**GARDEN HOSE**

alone during the past year, distributed throughout the United States and not a single piece complained of, justifies us in guaranteeing that it will give absolute satisfaction.

We were awarded an order of 25,000ft. for World's Fair

of our Celebrated  
**Seamless-Tube**  
COTTON RUBBER-LINED HOSE.

**We Want Your Trade.**  
Send for 60-page Catalogue.  
Write for Prices and Samples.

EBHARTWELL MFR. OF AXE, ADZE, PICK, SLEDGE, HATCHET, HAMMER, FOR EXPORT AND HOME USE 15 YEARS EXPERIENCE SEND FOR PRICES OHIO \$170 GALV

**CHAS. DAVIES & CO.,**  
MANUFACTURERS OF  
**LADDERS,**  
Extension and Single. Fire, Railroad and Painters' Ladders.  
**LAWN SWINGS,**  
Window Jacks and Swing Scaffolds. Trade discount 20 and 5% list. We pay the freight. Catalogue Furnished.  
329 to 335 West 3d St., Williamsport, Pa

# E. C. ATKINS & CO., Indianapolis, Indiana.

We make a Specialty of Fine High-Grade Saws.

## Atkins' Tuttle Tooth One-Man Saw.

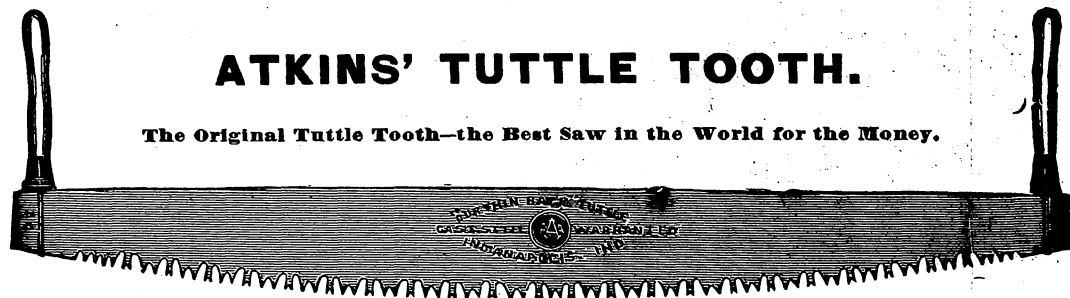


### BRANCH HOUSES:

Memphis, Tenn,  
Chattanooga, Tenn.  
Minneapolis, Minn.

## ATKINS' TUTTLE TOOTH.

The Original Tuttle Tooth—the Best Saw in the World for the Money.



## THE NATIONAL SAW CO., 96 & 98 READE ST., NEW YORK.



This saw is three gauges thinner on back than cutting edge, ground a true taper, making it the stiffest and easiest cutting one man saw produced.

We can also furnish the above with Diamond or Favorite Tooth. Packed six saws in dove-tailed wood case, with supplementary handles. No charge for cases. All saws bearing our name are fully warranted. We solicit your inquiries.

## Three Essentials

### IN THE MODERN CROSS-CUT SAW.

- 1.—Teeth of uniform thickness.
- 2.—Five Gauges taper in middle of blade.
- 3.—Three Gauges heavier on ends than in center of back.

For 10 YEARS the Simonds Crescent-ground Cross-cut Saw (the only Saw on the market possessing these **ESSENTIALS**) has stood out prominently in contrast with all other makes of cross-cut saws. It has been the **CRESCENT-GROUND** against the **FIELD-MODERN IDEAS** against **ANCIENT METHODS**.

**TO-DAY** the Crescent-ground Saw is in use in every important lumber camp in the United States. Manufacturers have endeavored to imitate it, but the Machinery producing the Saw, the Process by which it is produced, and **THE SAW**, are patented. All imitations are but involuntary acknowledgments of the **SUPERIORITY** of

### THE CRESCENT-GROUND CROSS-CUT SAW.

(PATENTED DEC. 26, 1882.)

SIMONDS MFG. CO.,

SIMONDS SAW CO.,

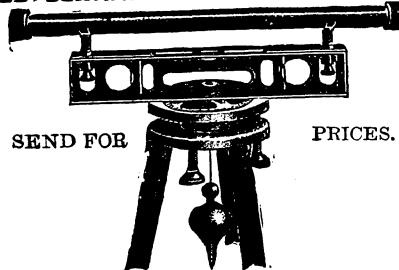
FITCHBURG, MASS.

CHICAGO, ILL.

SAN FRANCISCO, CAL.

PORTLAND, ORE.

## LEVELING & SQUARING INSTRUMENT.



SEND FOR

PRICES.

C. F. RICHARDSON & SON,  
ATHOL, MASS.

Manufacturers of Iron Levels and Carpenters,  
and Architects' Transits.

**THE GWINNER MANUFACTURING CO.**  
HAMILTON, OHIO, U.S.A.  
PATENTED SPECIALTIES.

**CATALOGUE FREE**

HARMON & DIXON, Agents, 118 CHAMBERS ST., N. Y.

HORACE E. BRITTON, Stoughton, Mass.,

Manufacturer of the

HENRY'S PATENT COMBINATION  
HAFT,



AND OTHER TOOL SPECIALTIES.

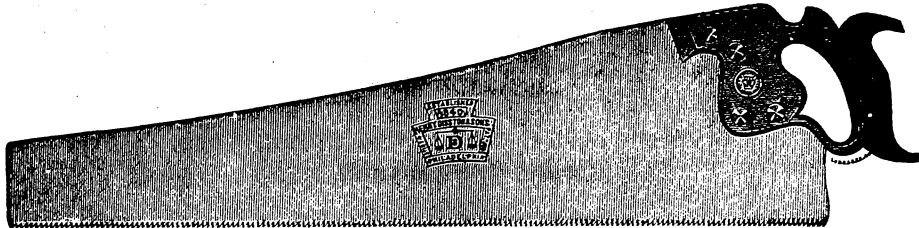
The Combination Haft contains  
six Brad-Awls, one Chisel, Screw  
Driver, Diamond Point Awl, Mark-  
ing Awl, Tack Puller and Reamer.  
Send for Circular and Prices.

Full Set Sent Post-paid on receipt of \$1.00. (No stamps.)

"If you want a Saw it is best to get one with a name on it which has a reputation.  
A man who has made a reputation for his goods knows its value as well as its cost and will maintain it."—HENRY DISSTON.

# THE SAWS THAT LEAD THEM ALL

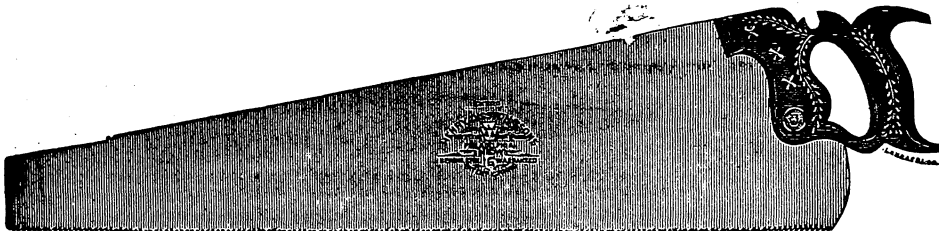
## DISSTON & SONS' PATENT D-8 HAND SAW.



This Saw combines all the valuable improvements in Hand Saws that have been made by us of late. The first and most important is the hollow or skew back, the success of which can best be attested by the number sold. The peculiar shape of the butt or heel, coupled with the new method of fastening to the handle, give a full stroke of the blade without fear of catching or hooking in the work; and as the handle is put further on the blade you have a full stop on the proper point and a greater command over your Saw, by reason of being two inches nearer the point, which must give more power.

The Saw being let into the handle on a circle, has a perfect bearing, which, with the new screws, makes it stronger and almost impossible to work loose, and avoids the unsightly gap that is seen on the back of the old style handle. All the above features are patented.

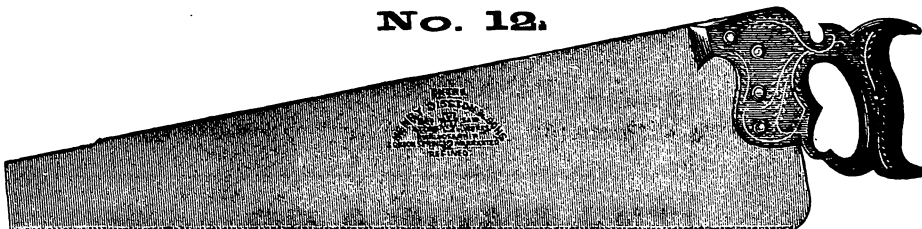
## Our New No. 16 Premium Saw.



### AN EXTRA FINE SAW IN EVERY RESPECT.

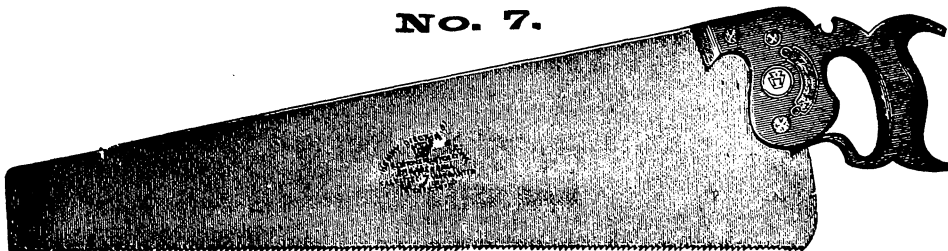
Having the Latest Close up Handle, Spring Steel Blade, Extra Thin Back, Finely Grained, with an Apple Handle and Four Brass Centennial Screws.

### No. 12.



DISSTON & SONS' Extra Refined London Spring Steel, Selected and highly Polished Blade, Handle Carved and Polished, 4 Improved Brass Screws, the finest Hand Saw manufactured.

### No. 7.



DISSTON & SONS' Cast-Steel, Warranted, Beech Handle, Polished Edge, 4 Improved Screws, Grained Blade.

"THE  
SAW;"  
HOW  
TO  
CHOOSE  
IT,  
AND  
HOW  
TO  
KEEP  
IN  
ORDER,  
Sent  
Free  
on  
Receipt  
of  
Name  
and  
Post Office  
Address.

"POCKET  
EDITION  
OF  
THE  
SAWYER"  
and  
"LUMBER-  
MAN'S  
HAND  
BOOK,"  
Sent  
Free  
on  
Receipt  
of  
Name  
and  
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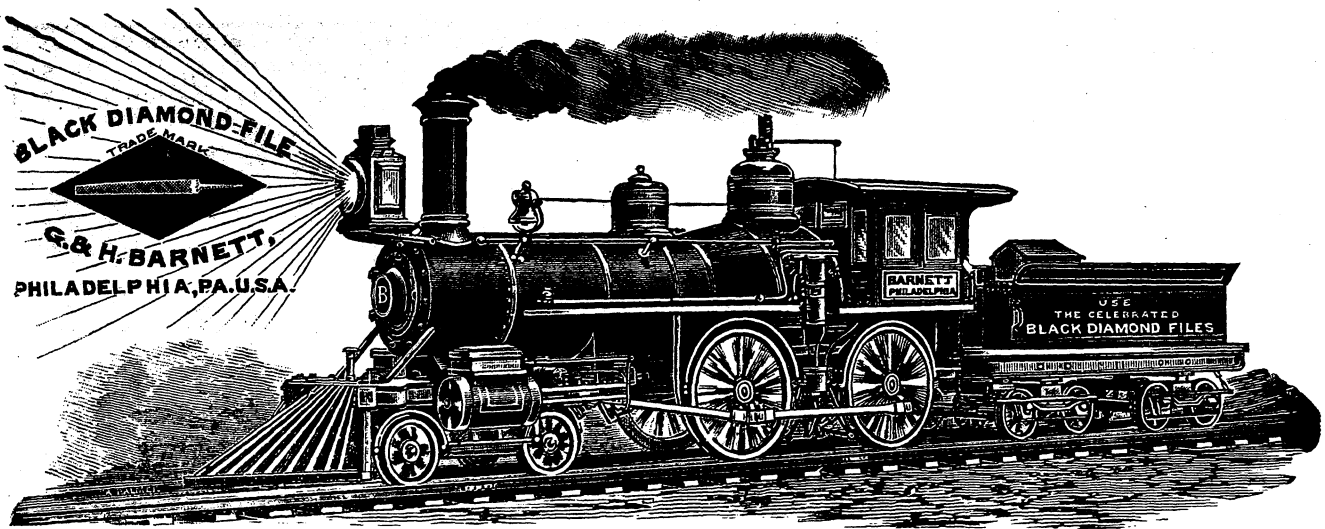
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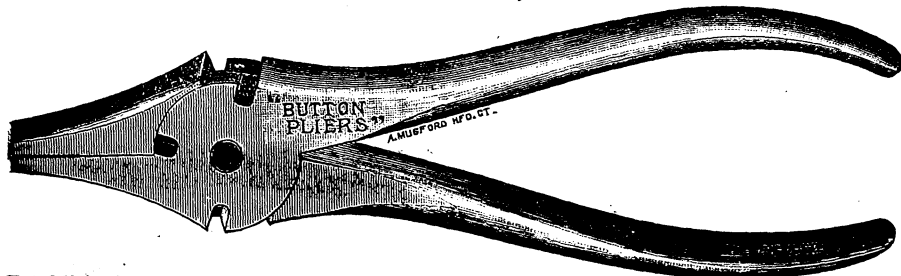
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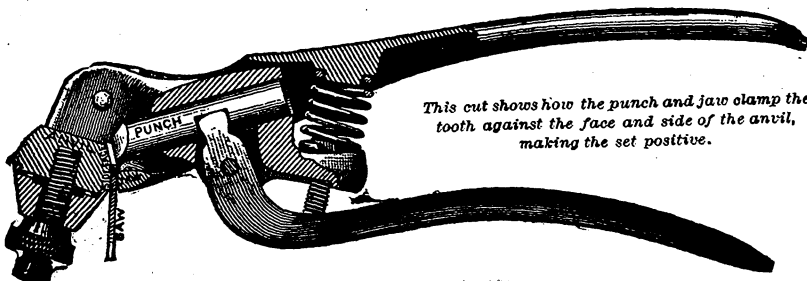
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Mechanics are now inquiring for this tool, and Hardware Dealers should have them in  
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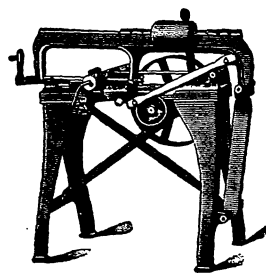
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Cuts off any size  
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Up to 4 1/2

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No skill required  
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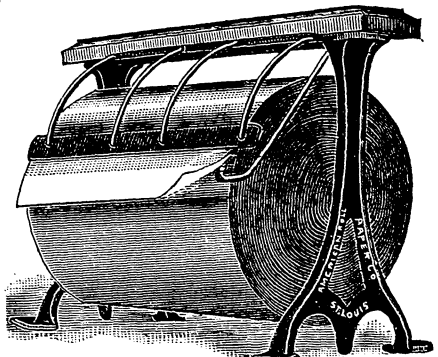
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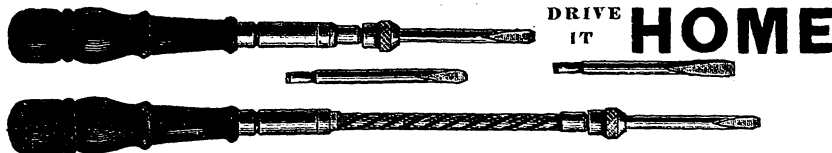
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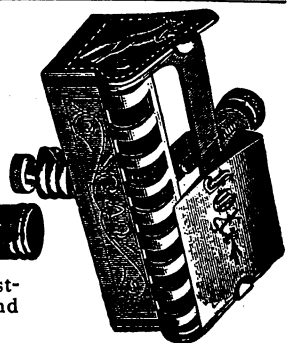
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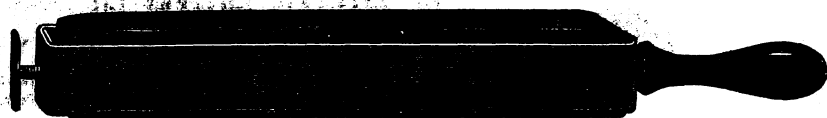
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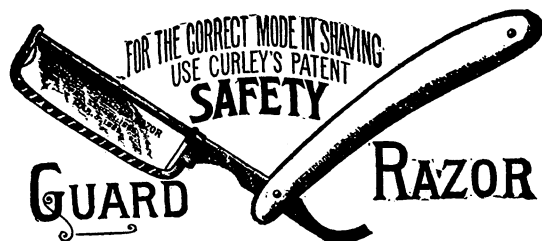
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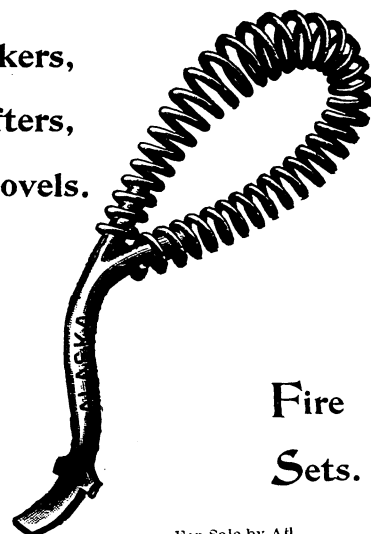
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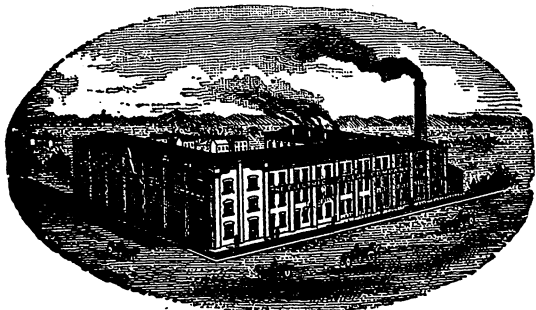
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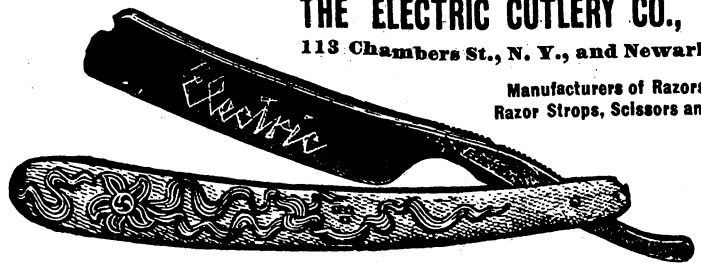
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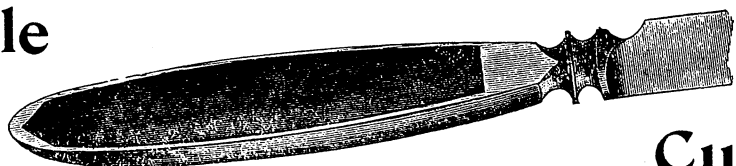


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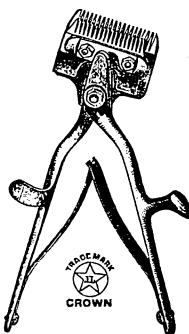
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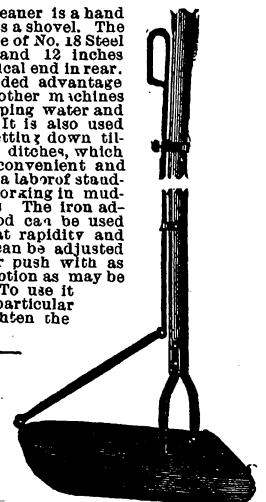
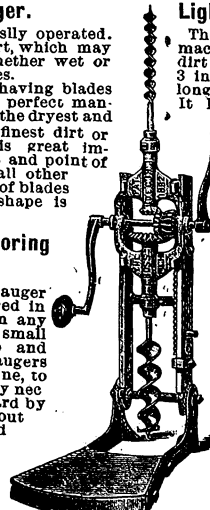
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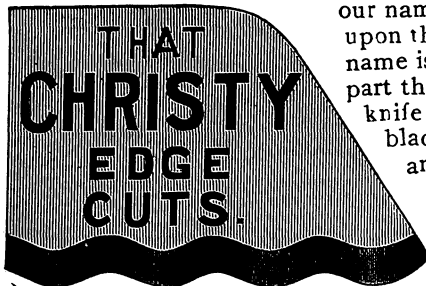
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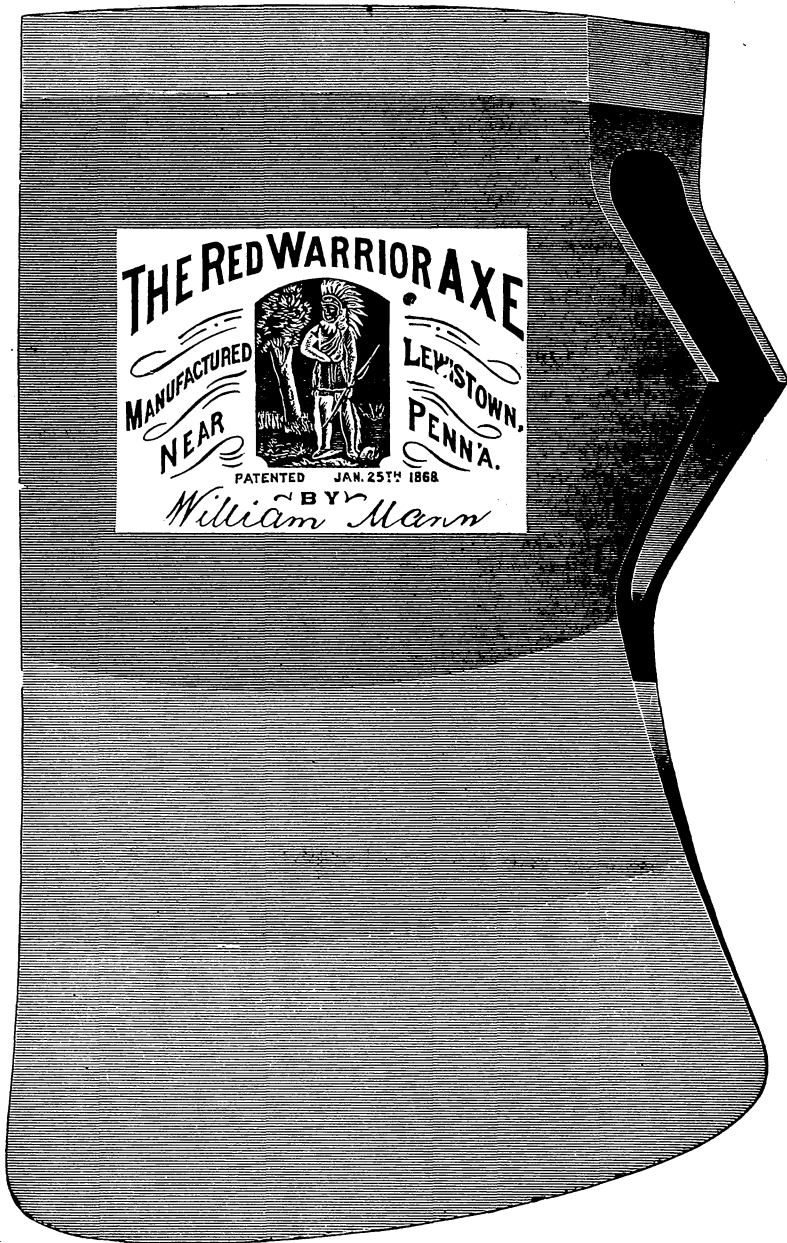
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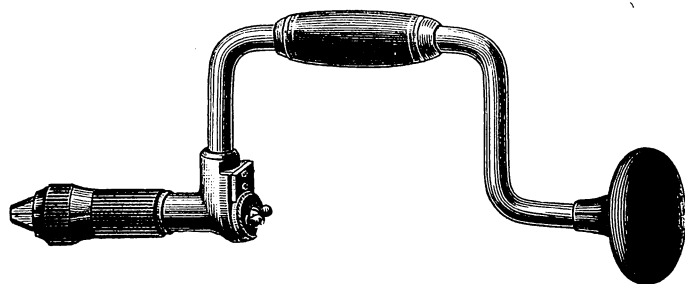
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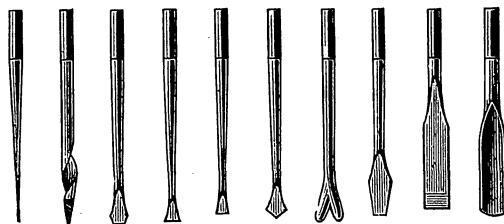
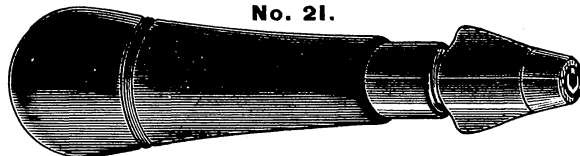
**Standard Bit Brace Ratchet.**



Patented.

**Standard Tool Handle.**

No. 21.



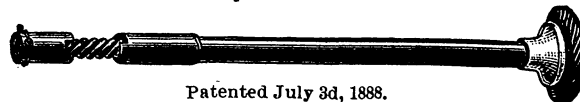
Patent Applied for.

**Standard Screw Driver.**



Patented March 25th, 1890.

**Standard Spiral Screw Driver.**



Patented July 3d, 1888.

**CHANTRELL TOOL CO., Manufacturers,**

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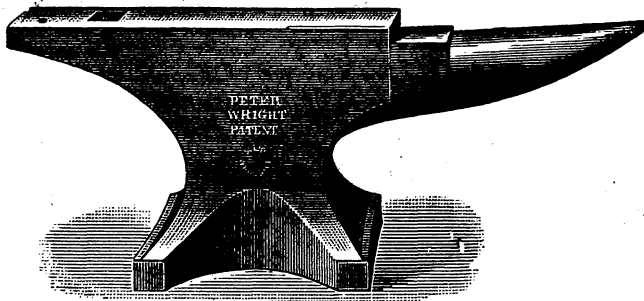


# Peter Wright's Patent Solid Wrought Anvil

PETER  
WRIGHT  
PATENT

SOLID  
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Fac-Simile of Trade-Mark.



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By Royal Letters Patent.

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## FRAY'S RATCHET BRACE.

Patented Dec. 25, '88, and Jan. 8, '89.

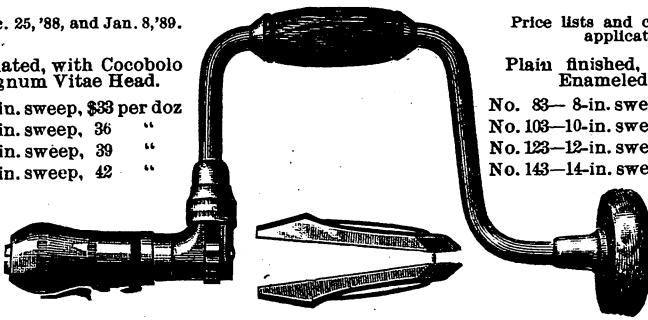
Nickel-Plated, with Cocobolo  
Handle, Lignum Vitae Head.

81— 8-in. sweep, \$33 per doz  
101—10-in. sweep, 36 "  
121—12-in. sweep, 39 "  
141—14-in. sweep, 42 "

Price lists and catalogues on  
application.

Plain finished, with Black  
Enameled Head.

No. 83— 8-in. sweep, \$18 per doz  
No. 103—10-in. sweep, 19 "  
No. 123—12-in. sweep, 21 "  
No. 143—14-in. sweep, 23 "



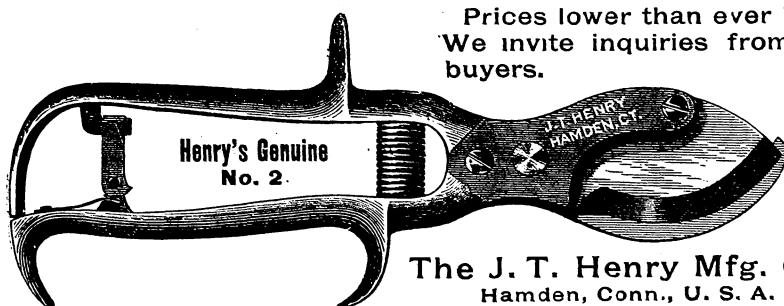
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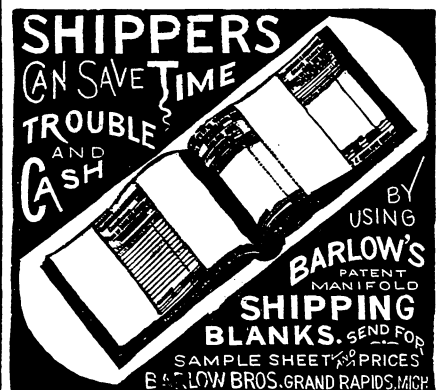
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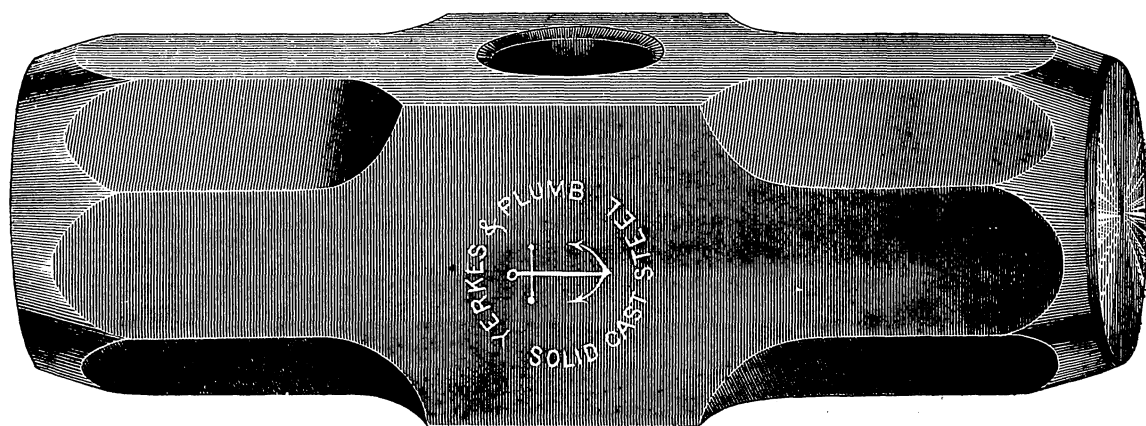
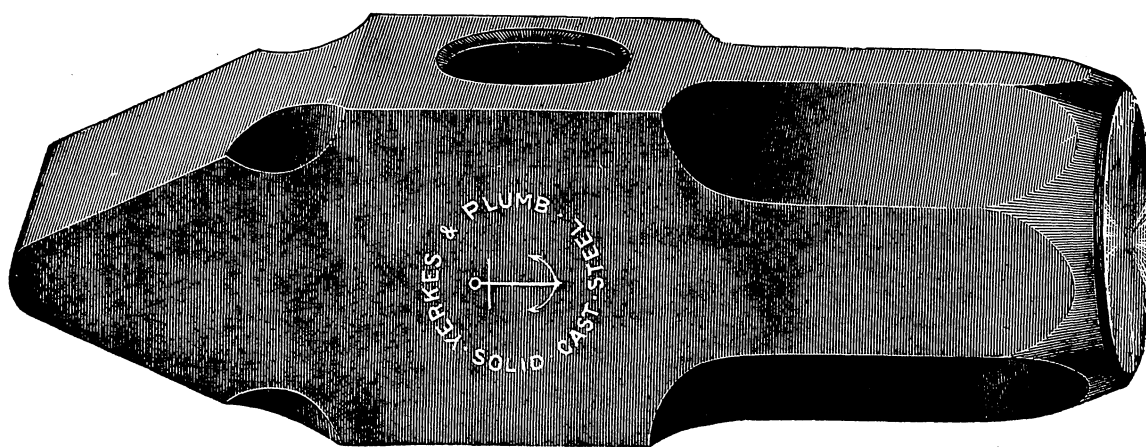
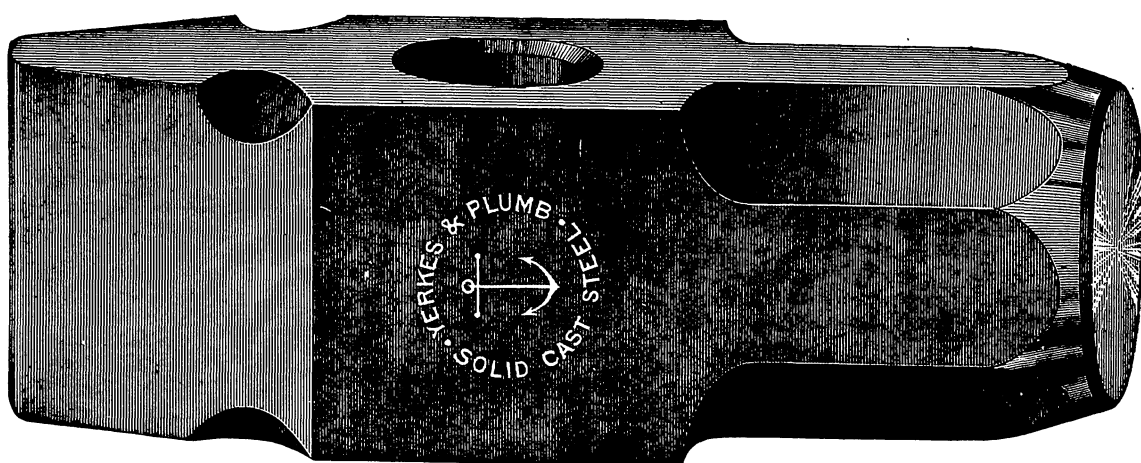
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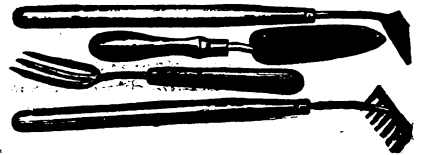
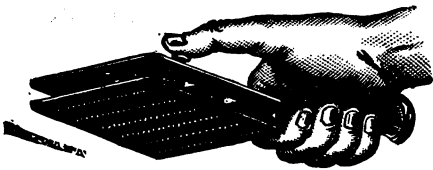
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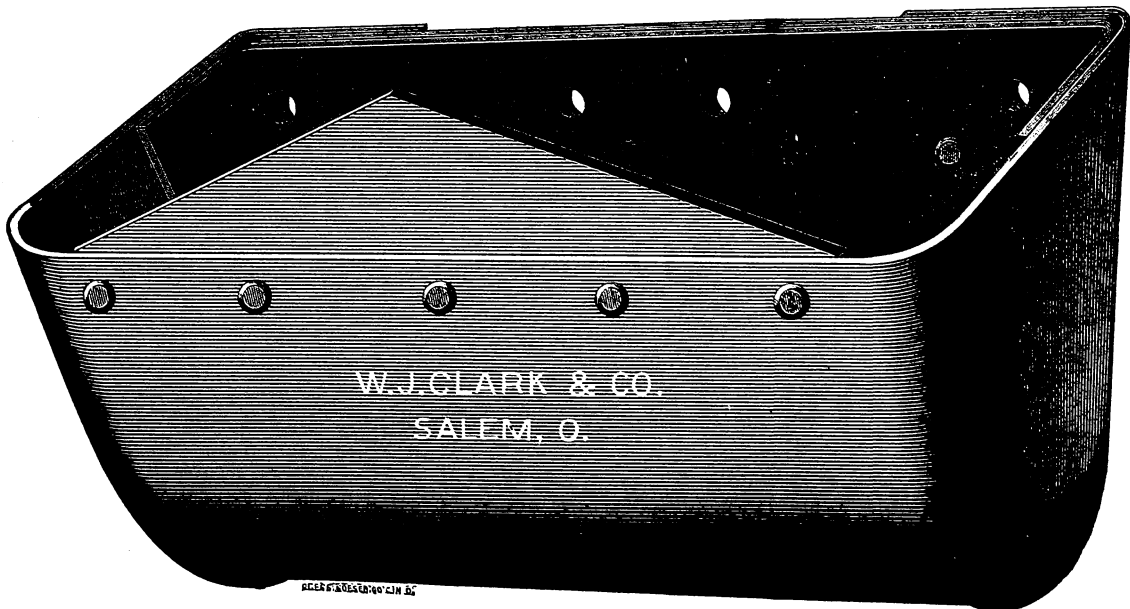
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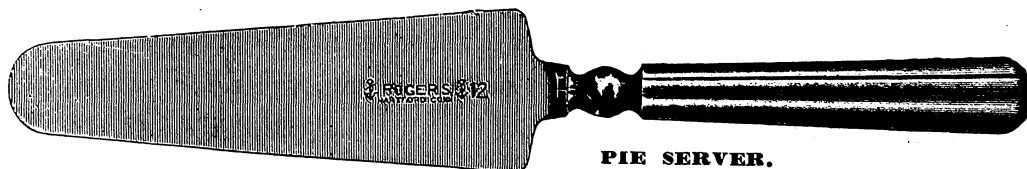
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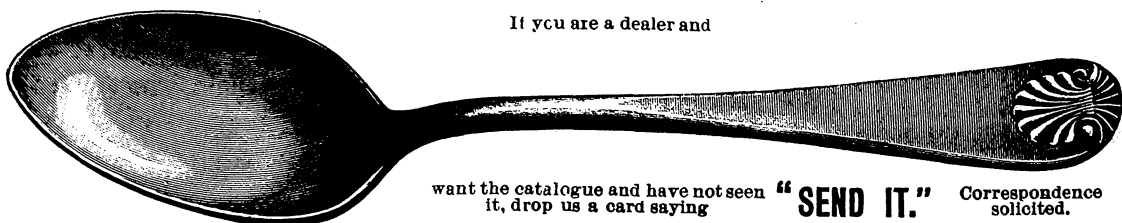
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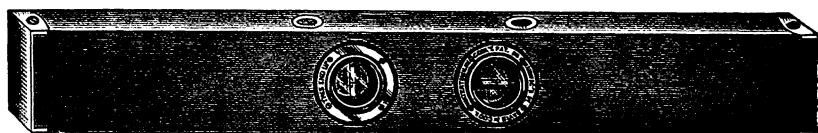
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FIG. 3. Showing Davis cork-screw and fulcrum in position to pull cork.

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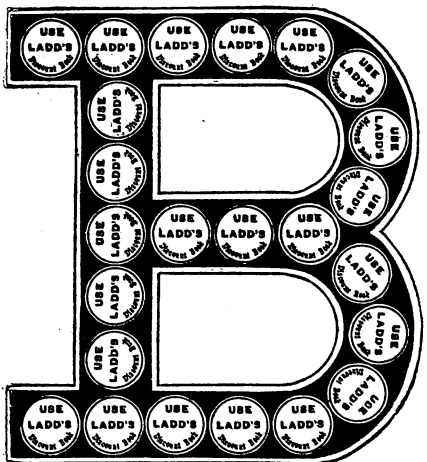
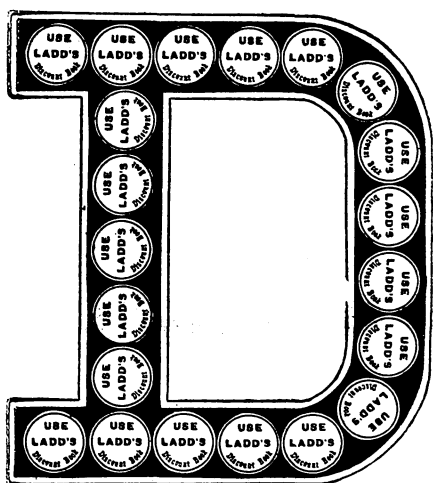
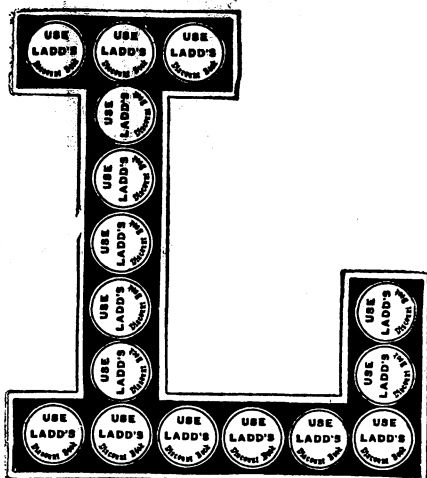
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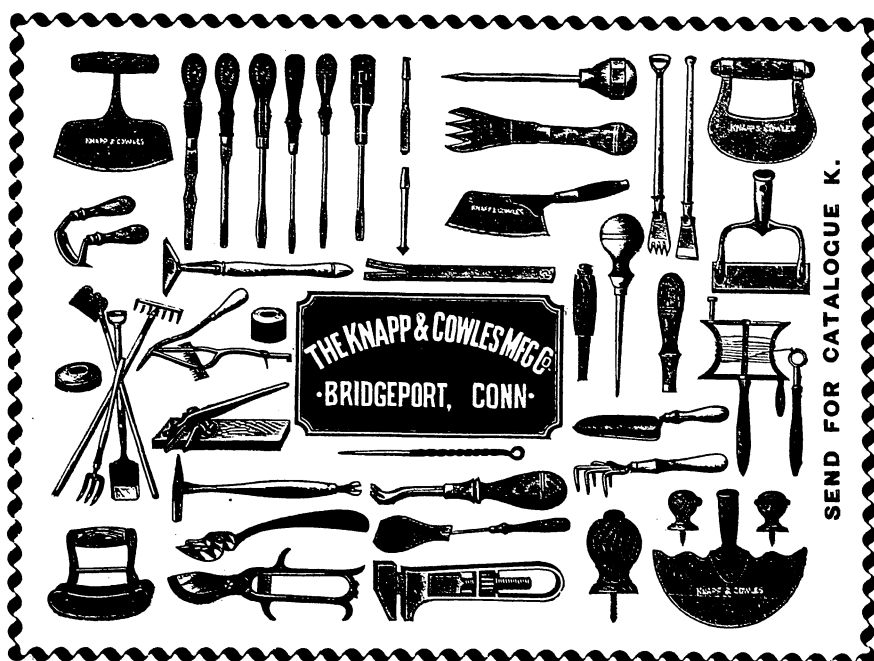
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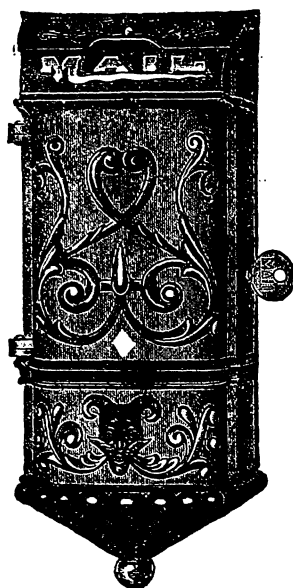
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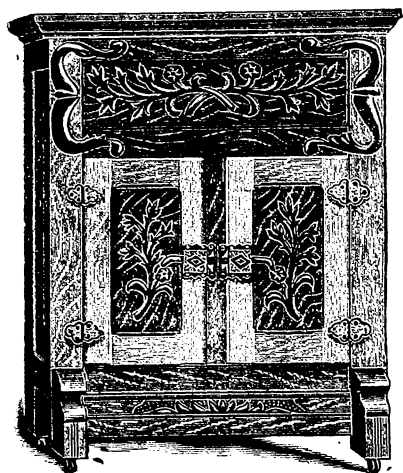


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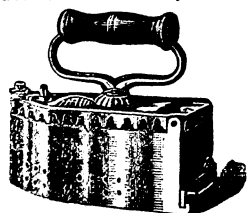
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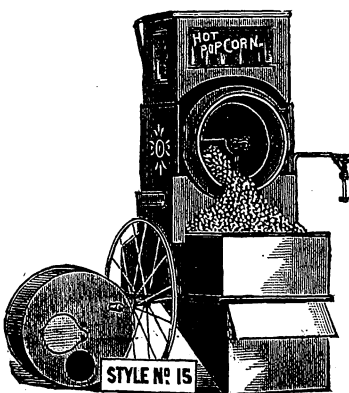
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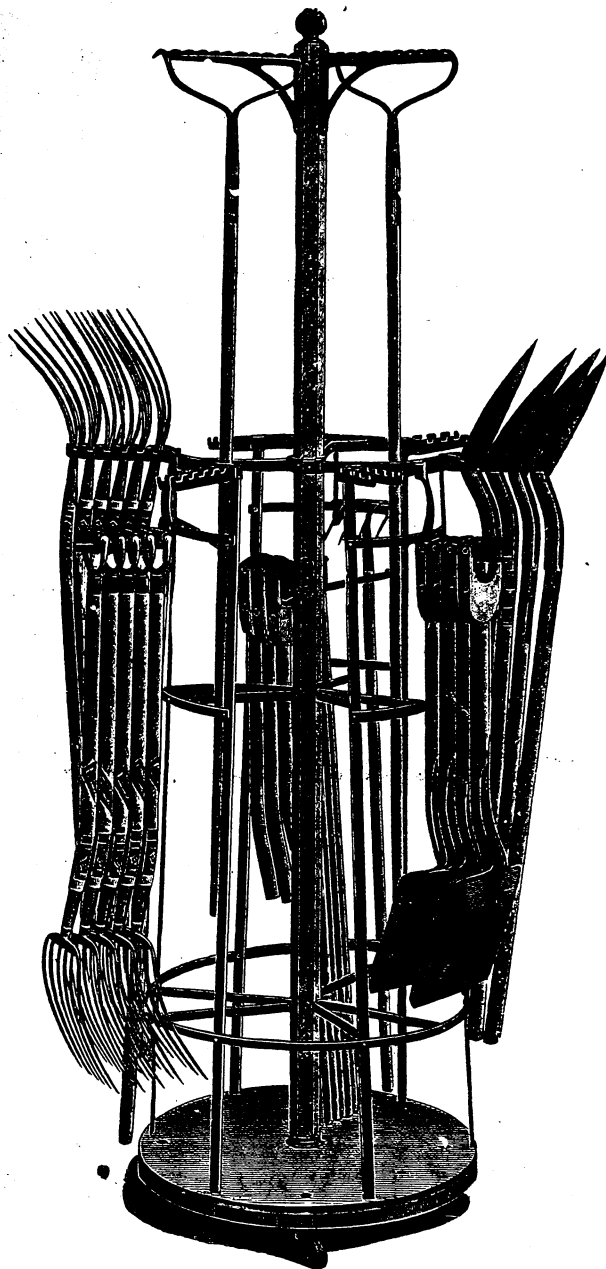
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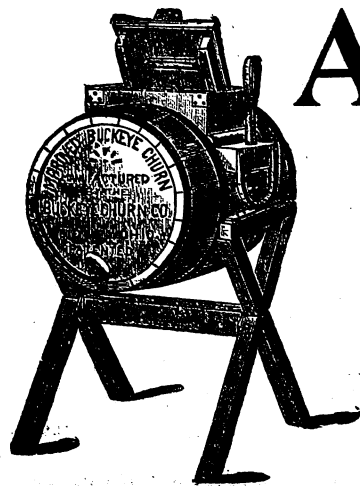


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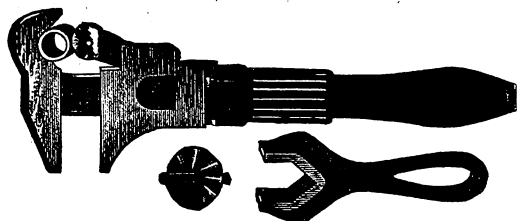
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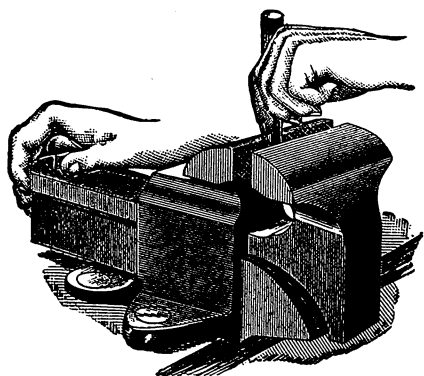
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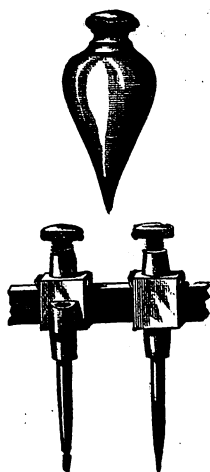
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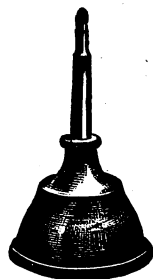
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tionary or Swivel Base.



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Handles.



Challenge Iron Planes.  
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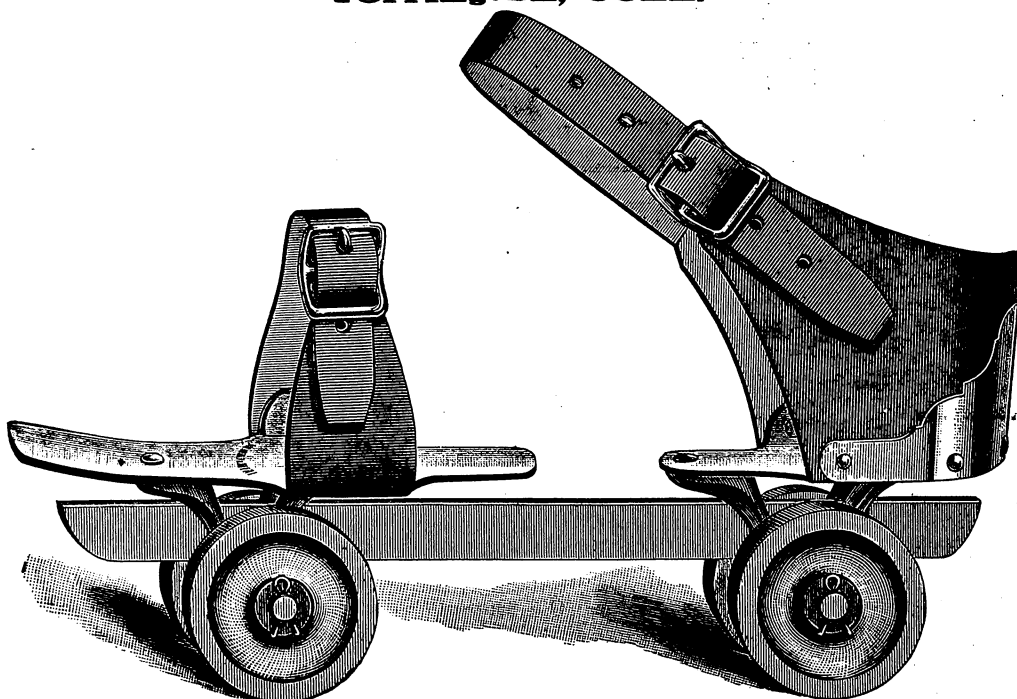
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Purchasers of the Glue Business of The Le Page Co.

Gloucester, Mass.

New York City.

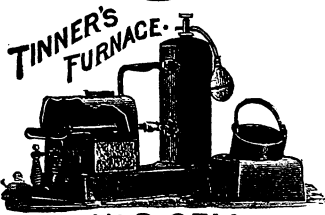
JOHN J. TOWER, of Tower & Lyon,  
New York, President.

C. E. HUBBARD, Boston.  
Treasurer.



The Improved Process Glue Co., having purchased from The Le Page Co., all its patent rights, formulas, glue stock and material, and having secured control of its glue factory, machinery, etc., will continue the manufacture of Liquid Fish Glues in all the various grades heretofore offered by The Le Page Co., under the personal supervision of Mr. Wm. N. Le Page, and under the Improved Process Patent issued October 26th, 1886. As is well known, the Improved Process by which these goods are made assures the highest strength with thorough uniformity as to quality, consistency and color. We call special attention to our Improved Process Family Glues, neatly put up for family use, and also to our Improved Process Carriage Glue for wood-work, put up in every variety of size and style. This Carriage Glue is undoubtedly the strongest and best glue for every variety of cabinet and wood-work, and has earned its high reputation. All our canned glues are put up with the new patent cap or fastening, patented January 22d, 1889, which has proved a great convenience and success. Our glues will be readily identified by our characteristic Blue Label, and the Trade-Mark shown at the head of this page. Send for Price-List. Messrs. Tower & Lyon will have charge of our New York office. Very truly yours,  
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No 3 GEM

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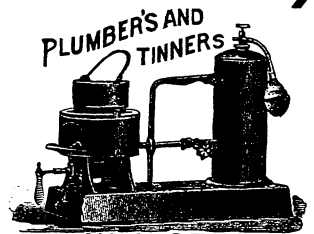
Price each, Tin Reservoir, \$7.00. Plumbers' Hood for No. 3, 50 cents.  
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No. 3 guaranteed to work out of doors or on roofs in all kinds of weather  
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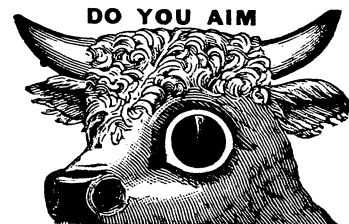
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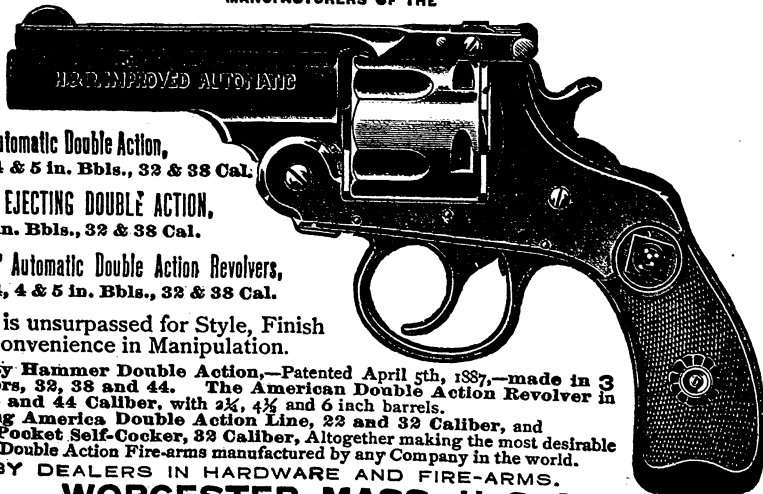
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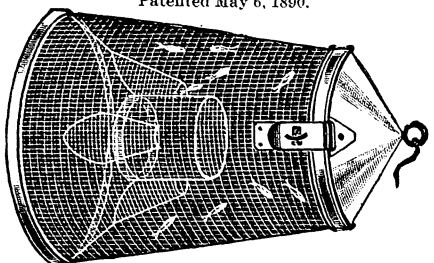
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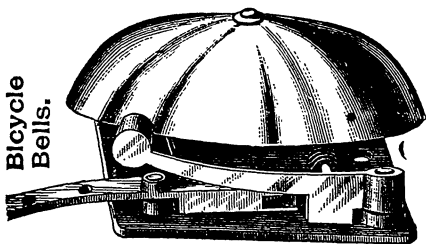
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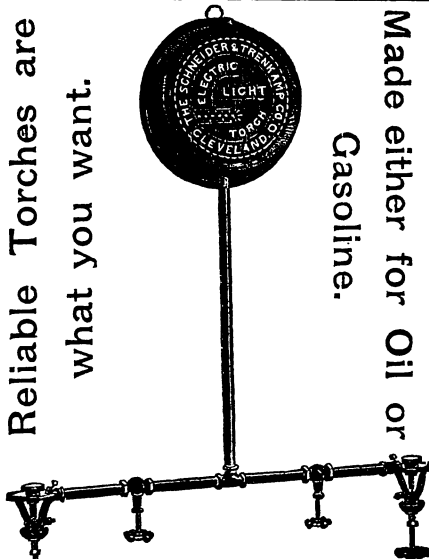
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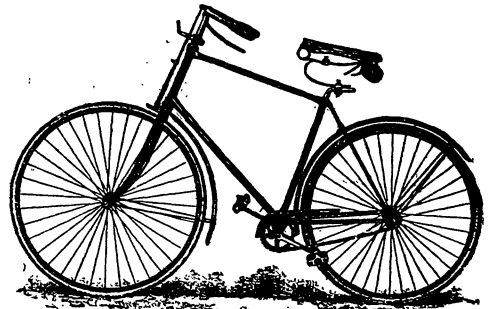
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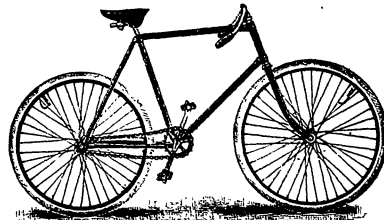


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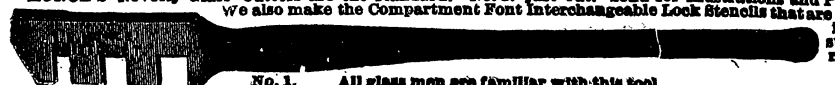
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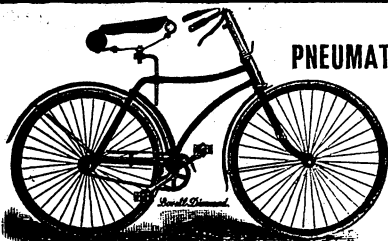


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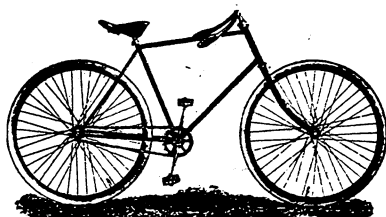


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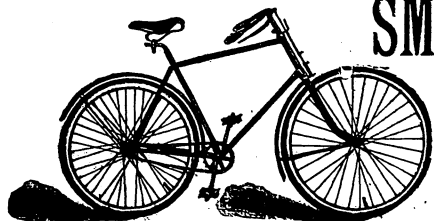
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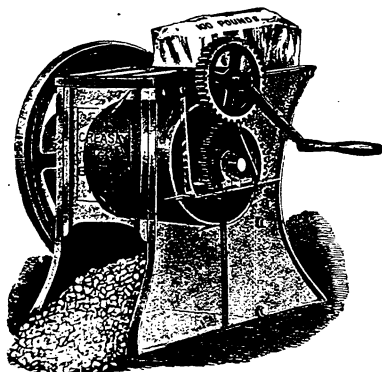
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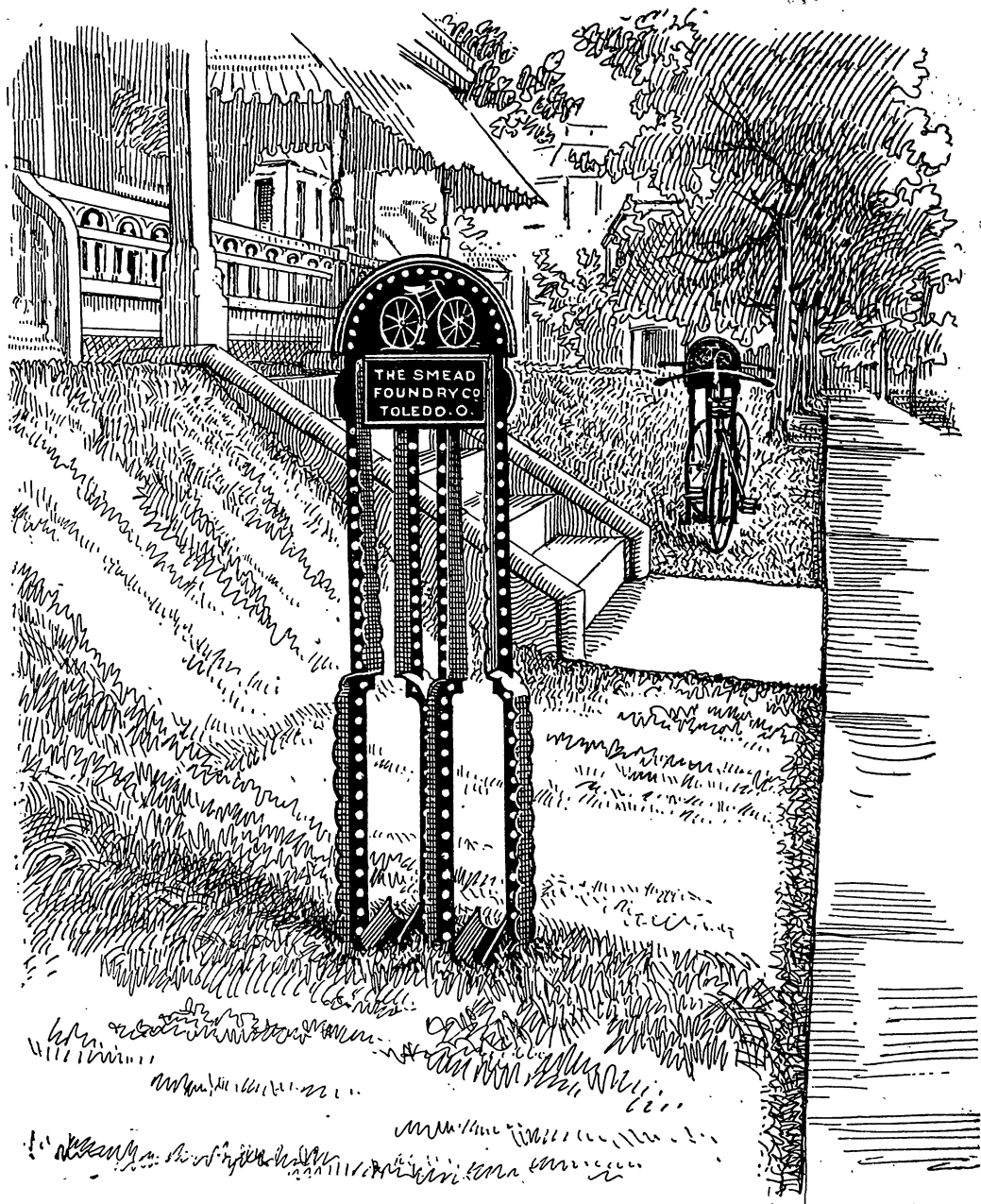
An address to the Institute of Accounts, New York, of which the writer is a member, put in form to assist those in charge of manufacturing accounts. Practical forms are included for a series of order books, examples of foreman's order, form of pay-roll, quarter-time book, job time book, form of summary, charges book, summary of costs, material, labor, cash, expense, manufacturing and improvement acts, store-room, iron foundry, brass foundry.

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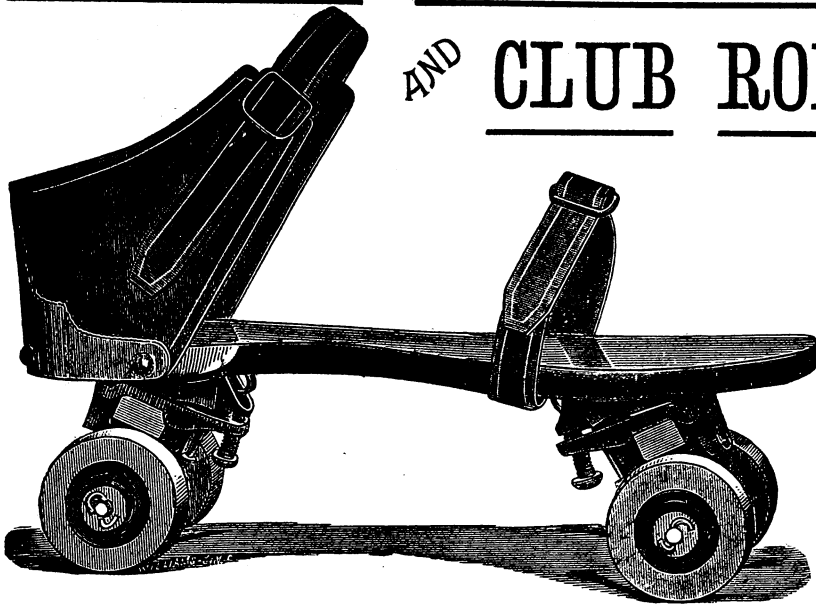
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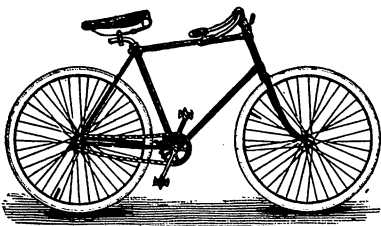
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EVERY  
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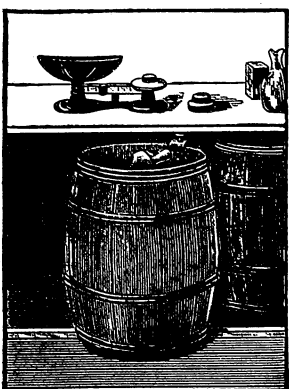
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Arranged by R. R. WILLIAMS, Hardware Editor of the Iron Age.

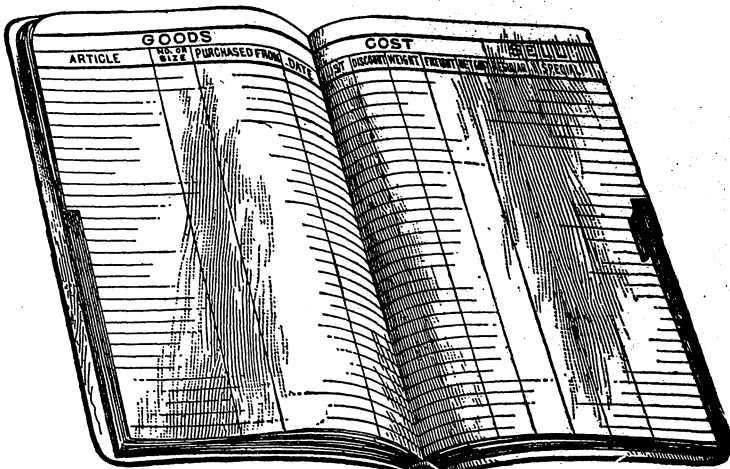
These Books are printed on paper of superior quality and bound in grain seal leather.

Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

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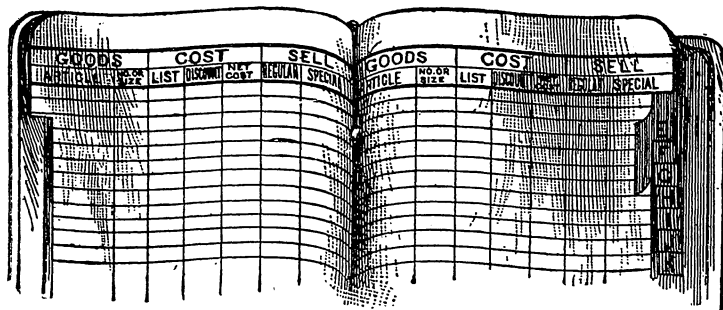
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In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

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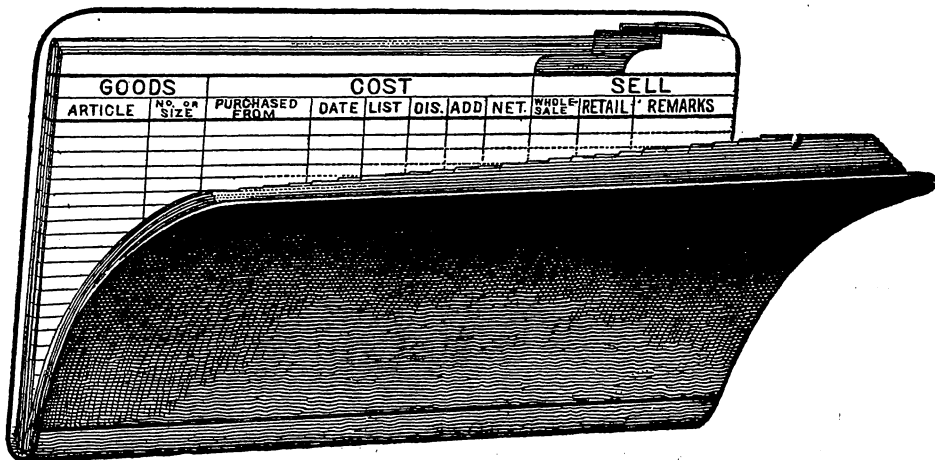
Hardware Price Book B.

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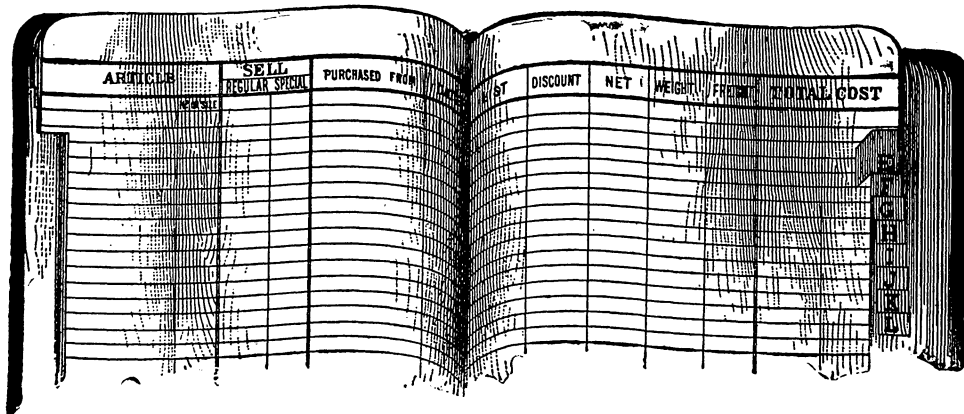
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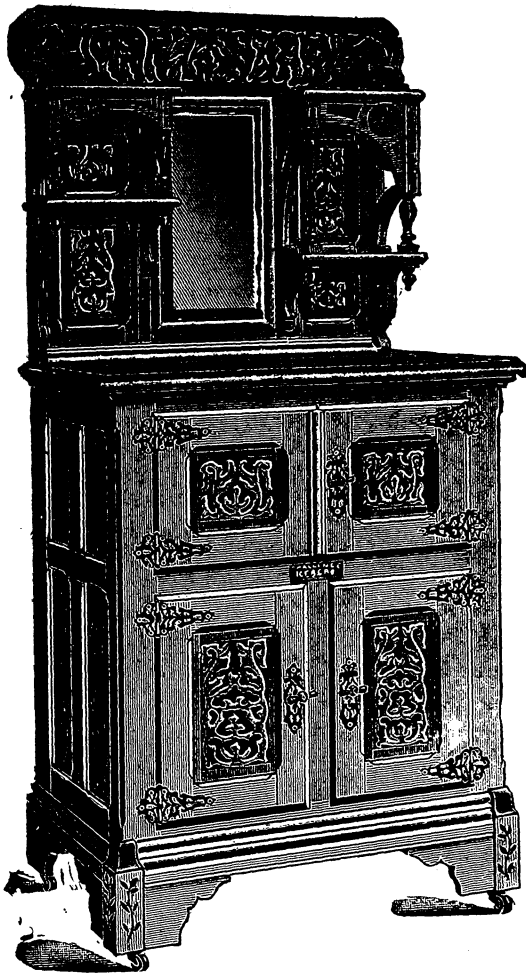
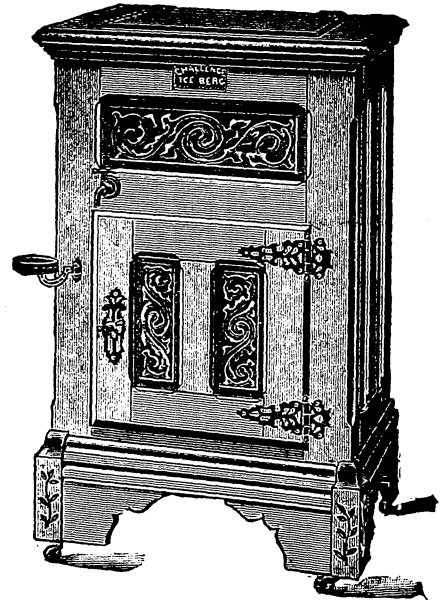
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ABOVE TARGETS ARE ACTUAL SIZE.

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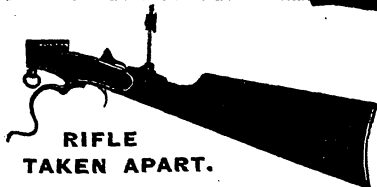
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IT IS SIMPLY IMPOSSIBLE

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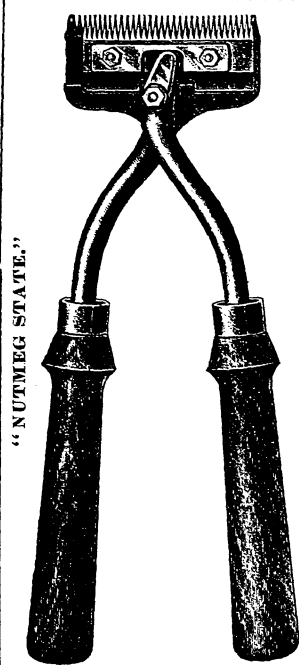
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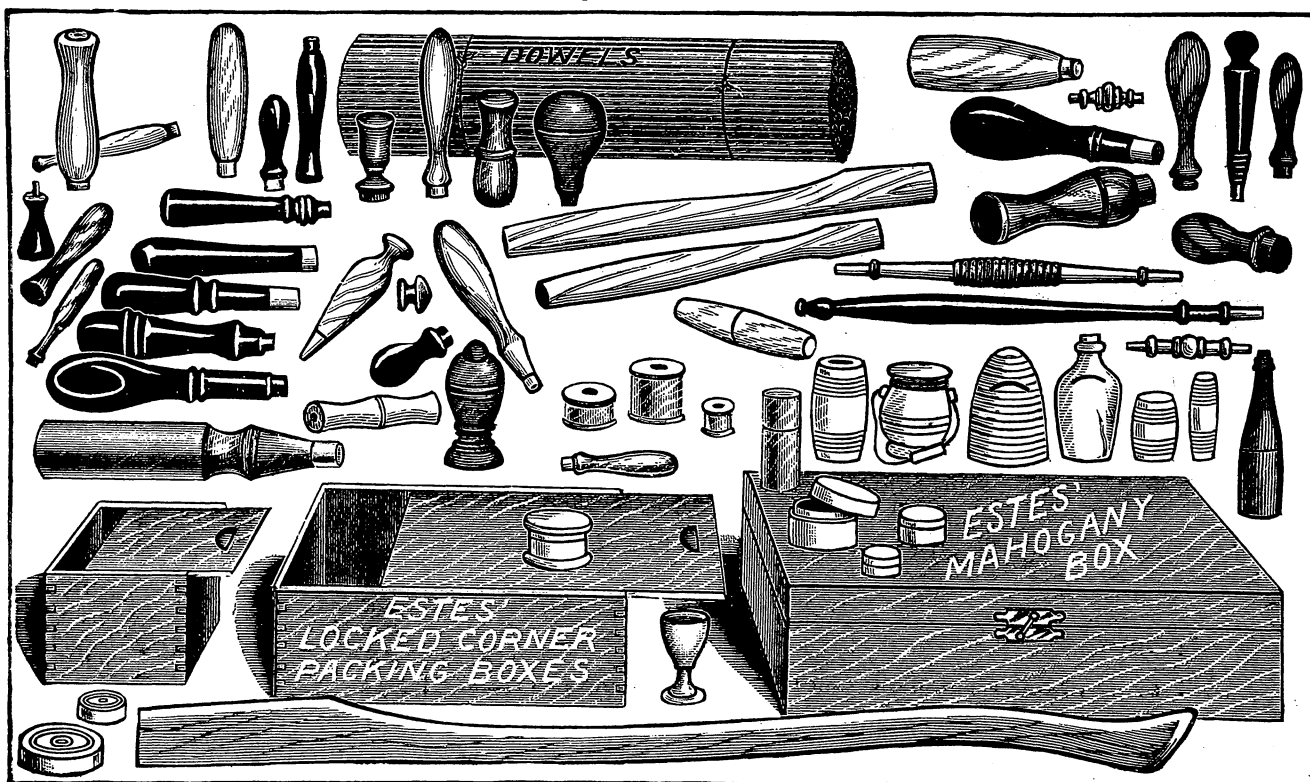
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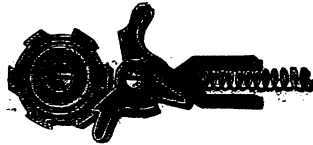
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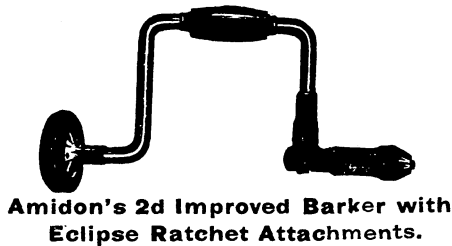
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Advantage in using Amidon's  
Patent Corner Brace.

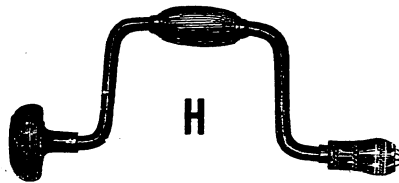


Section of Eclipse Ratchet Brace.

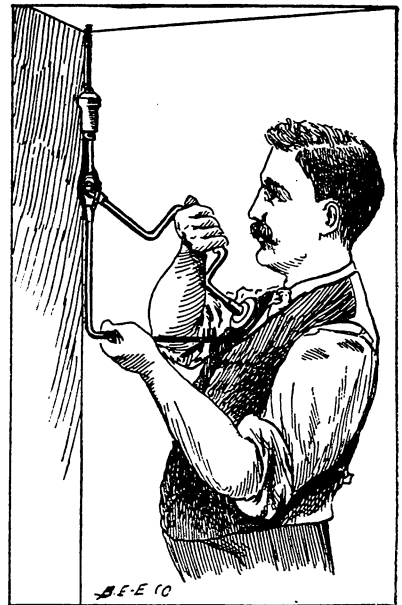
Write for Prices and Catalogue.  
You will find the line we  
represent the largest,  
best and most com-  
plete made.



Amidon's 2d Improved Barker with  
Eclipse Ratchet Attachments.



Amidon's Cheap Barker Imp. Brace.



**JOHN H. GRAHAM & CO., 113 CHAMBERS ST., NEW YORK CITY.**  
GENERAL AGENTS.

BUSINESS ESTABLISHED  
1798.

INCORPORATED  
1891.

**JOS. F. McCOY CO.,**

26 Warren St., New York,

—Importers and Dealers in—

**HARDWARE, CUTLERY TOOLS**

—AND—

**RAILWAY SPECIALTIES.**

SOLE AGENTS FOR

Monarch Cutlery Co., { Pocket Cutlery, Scis-  
Irving Cutlery Co., { sors, Tools, etc.  
George Butler & Co., { Razors, Table Cutlery  
etc.  
Warrington Shear Co., { Warranted Shears  
Scissors, etc.  
Peugeot Frères, { Celebrated "Lion" Band  
Saws, Tools, etc.  
Gueutal & Sons, { Celebrated French Plyers  
and Jewelers' Tools.  
Coates Clipper Mfg. Co., { Patent Horse and  
Hair Clippers.  
Tangyes, Limited, { Hydraulic Jacks, Blocks  
etc.  
Wm. Eades, Son & Co., { Patent Differentia  
Pulley Blocks.  
Weston's Patent Ratchet Drills.  
Weiller & Co., Brass Wire Cloth.

Headquarters for

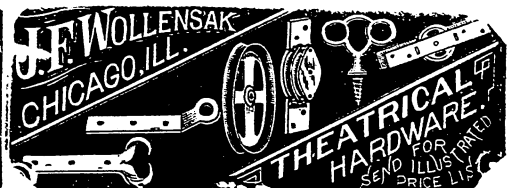
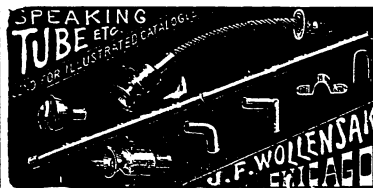
Empire Knife Co. and La Belle Cutlery Co

**A. S. HENN & CO.,**

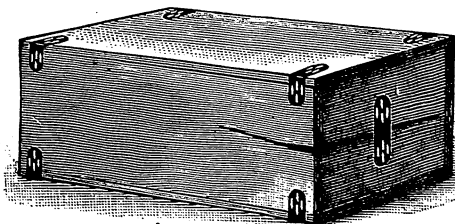
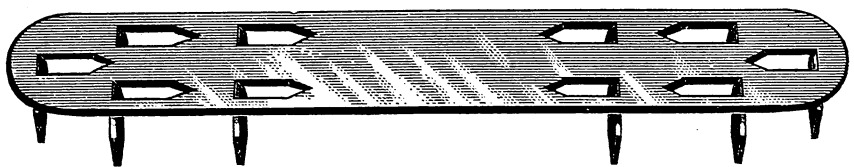
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ers, Pocket Wrenches, Mining  
Knives, Clothes Line Pulleys, &c.  
Send for Catalogue.

NEW HAVEN, CONN.



**Require No Nails. Quickly Applied.**



Our new line of Box Corners  
and Fasteners are made in FIVE  
SIZES for light and very heavy cases.

SEND FOR CIRCULAR M.

**Cary Manufacturing Co.,**

9 ELM STREET, N. Y.,

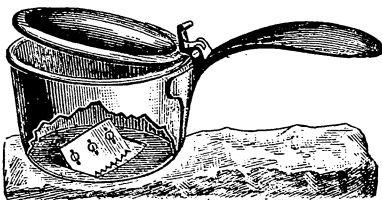
Bet. Reade and Duane.

# ENTERPRISE M'FG CO. OF PA.,

THIRD AND DAUPHIN STREETS, PHILADELPHIA.

## ICE SHREDDER,

TO SHRED OR SHAVE ICE,  
For Fruits, Drinks, Oysters and  
Clams on the Half Shell,  
Olives, Celery, Radishes,  
Iced Tea, Sliced  
Tomatoes, &c.,  
&c. &c.



No. 33, TINNED,

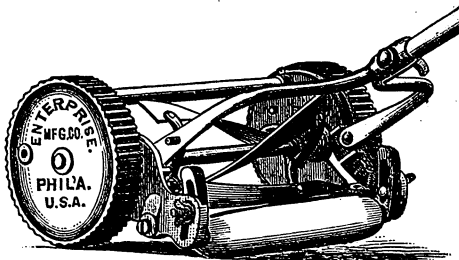
Price, - - per doz., \$7.20.

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Price, - - per doz., \$24.00.

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7, 9, 11, 13 and 15 inches.  
Simple in Construction.  
Easily Adjusted.

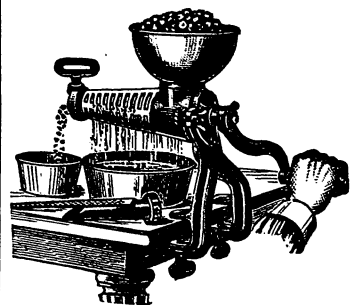
Light Running.

Highly Efficient.

Durable.

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FOR MAKING  
Wines, Jellies, Fruit  
Butters, &c.

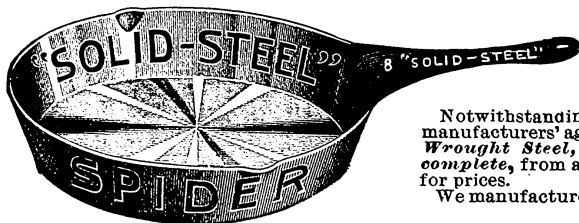


No. 24, FRUIT PRESS,  
Price, \$3.00.

No. 28, DRUG PRESS,  
Price, \$4.00.

FOR SALE BY THE HARDWARE TRADE. SEND FOR CATALOGUE.

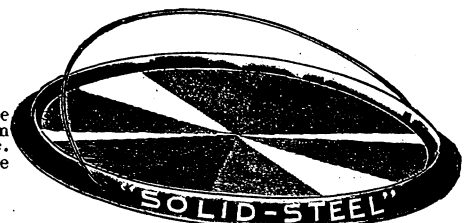
## "SOLID-STEEL" SEAMLESS HOLLOW WARE.



BRILLIANT FINISH.

Notwithstanding the claims made by some  
manufacturers' agents, our spiders are made from  
Wrought Steel, Without Seams or Rivets.  
complete, from a single piece of metal. Write  
for prices.  
We manufacture our own goods.

No Seams, no Rivets in "Solid-Steel" Ware.



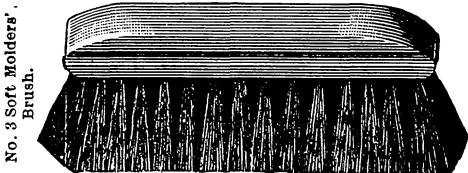
Made either with Balls or Solid Handles.

The Cleveland Stamping & Tool Co., Cleveland, O.

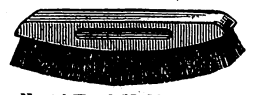
We are in shape to figure on light and heavy stamping, and in addition to the above we build Dies and Stamping Machinery.

## JOS. LAY & CO. RIDGEVILLE, INDIANA,

—MANUFACTURERS OF—



No. 3 Soft Molders' Brush.



No. 10 Hard Molders' Brush.

Hard and Soft Molders' Brushes, Steel Wire Casting Brushes, Stable,  
Shop, Street, Boat and Carpet Brushes, Brooms  
and Brushes of all kinds.

HIGH GRADE.

LOW PRICED.

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HOLLOW WARE and HARD  
WARE SPECIALTIES.

The STUART & PETERSON CO.

PHILADELPHIA, PA., U. S. A.

**American Stamping Co.,**

Manufacturers of

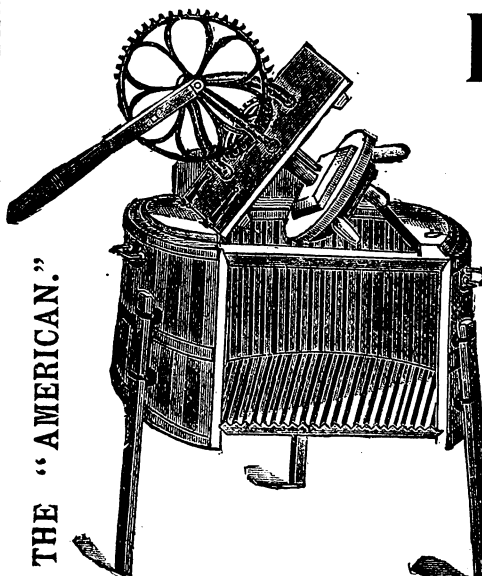
All Kinds of Tinware and Sheet  
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N. Y. Office and Salesroom, 104 & 106 John St.

Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.

Tips to Inventors. By ROBERT GRIMSHAW, Ph.D.,  
M.E. Telling what inventions are needed and how  
to perfect and develop new ideas in any line.  
Cloth.....\$1.00

For sale by David Williams, 96-102 Reade St., N. Y.



THE "AMERICAN."

## Its Shape

is what commends the

## AMERICAN WASHER

to users. Hence the trade  
want to, and do, sell it largely  
because of its perfect op-  
eration. Ease, rapidity and  
cleanliness without tearing  
are its leading features.

Write for Catalogue.

**Union Manufacturing Co.,**

WM. PETER, Owner,

TOLED O, O

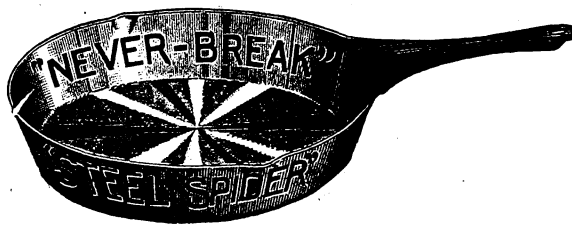


**"PURITAN"**COOKERS, COFFEE POTS AND  
OTHER SPECIALTIES.Cooks Quicker than any other  
Porcelain Rice Boiler made.**"NEVER-BREAK"**

Wrought Steel Spiders

Wrought Steel Griddles, Kettles, Stew Pans, Stew Pots, Masilins,  
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MIRROR POLISHED—TINNED—PORCELAINED.

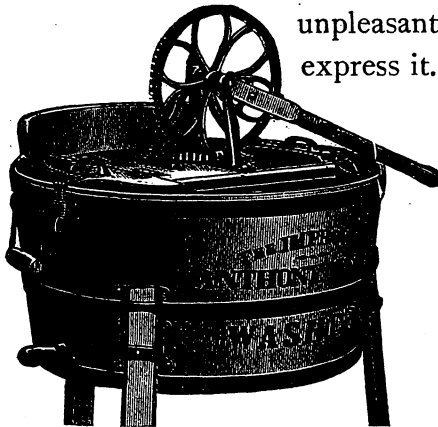


"MIRROR POLISH," the only Perfect Plain Steel Finish

SOLE MANUFACTURERS

**THE BRONSON SUPPLY COMPANY,**  
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PLANISHED and PLAIN STEEL.**Imagine = =**

The circumstances under which clothes are washed. Sloppy, unpleasant, nasty, are mild adjectives to express it. The Anthony Wayne Washer does away with all that; besides does not tire the operator or tear the clothes. Dealers stating these facts have no difficulty in selling them. Write

**THE ANTHONY WAYNE  
MFG. CO.,**  
FT. WAYNE, IND.**THE W. BINGHAM CO.,**146, 148 and 150 Water St., and 97 and 99 Superior St.,  
**CLEVELAND, O.****LAWN MOWERS FOR 1893.**THE BINGHAM.  
THE RED CLOUD,THE  **HIGH WHEEL.**THE DIAMOND HIGH GRASS.  
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WRITE FOR PRICES.

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ARE NOW MADE BY

**C. T. WILLIAMSON'S  
WIRE NOVELTY CO.,**  
NEWARK, N. J.**HAND FORGED  
CRUCIBLE STEEL,  
HARDENED and TEMPERED.  
WARRANTED.**

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**TUCKER'S PATENT  
FURNITURE CASTER.**Malleable Iron  
Castings.**Will  
Not  
Break.**Round  
Oblong  
Stem  
Plate  
AND  
Combined  
Common  
Drive or  
Fox Stem.  
(SEE CUT.)The most satisfactory Anti-Friction  
Caster in the market.

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Catalogue, Discount and Sample.

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**INDIANAPOLIS.**

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LARGE SIZE FOR OFFICE USE.

6x9 1/2 Inches, 500 Pages.

Bound in Leather, Price, \$8.00.

**Pocket Edition.**

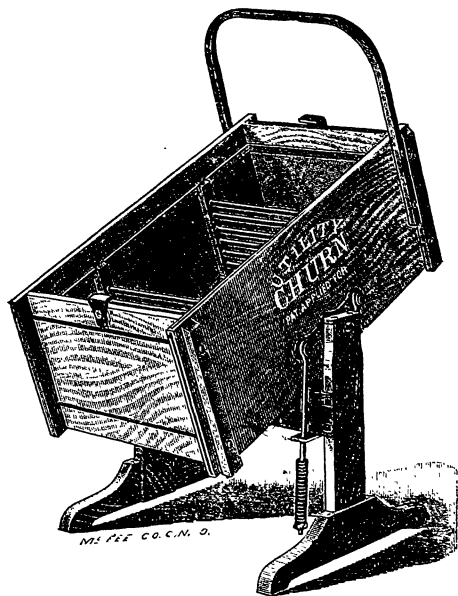
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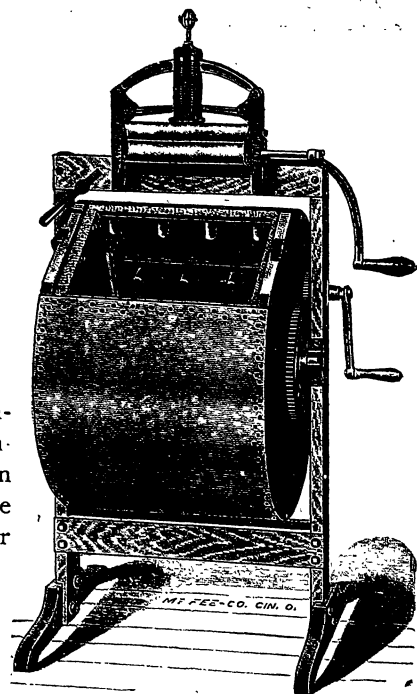
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# A Guarantee of Ten Per Cent.

More butter from the same amount of cream, with  $\frac{1}{4}$  the labor, commends "The Utility" Oscillating Churn to both seller and user. If you will write we will explain it

## Our Paragon Washer



Has no kindred. In construction, symmetry and mechanical finish throughout it is beyond compare. Its operation is simple, easy, yet effective, and combines the principle of the "old pounding barrel" together with the abrasion of the clothes through self-contact, thereby producing the most effective rubbing with the least possible wear and tear. Will you write for our lowest net prices?

Manufactured by **OLDS WAGON WORKS,** FT. WAYNE, IND., U. S. A.

## THE IRON AGE STANDARD HARDWARE LISTS

### FOR USE IN PRICE BOOKS.

Compiled by R. R. WILLIAMS, Hardware Editor of The Iron Age.

PRICE 25 CENTS.

This pamphlet contains the principal standard Hardware price-lists in as clear and compact an arrangement as possible, so as to permit their being advantageously cut out and inserted in the price book. In order to make them adapted to this use they are printed on thin and tough paper of fine quality and on only one side of the paper.

#### Saucepans and Round Boilers.

Pints.	Plain	Turled.	Tin'd or En'd.
1	\$0.30	.35	.39
1 1/2	.32	.37	.44
2	.35	.39	.48
3	.42	.47	.56
Quarts.			
2	.50	.56	.63
2 1/2	.53	.59	.68
3	.55	.62	.73
4	.60	.68	.84
5	.65	.75	.96
6	.70	.81	1.11
7	.75	.84	1.21
Gallons.			
2	.85	.96	1.31
2 1/2	1.05	1.18	1.56
3	1.20	1.35	1.70

The success of the effort to give the lists in small space is illustrated in many of the lists, in which a clear and condensed arrangement is secured. For instance, the wrench list occupies but 3 inches by  $\frac{1}{4}$  inch, while the list of Stove Hollow Ware, in very small space, gives the list prices on a large and important line of goods which often occupy several pages in catalogues. In several lists, such as Strap and T Hinges and Butts, a new arrangement is adopted, which is regarded as presenting these lists in a very convenient as well as condensed form.

As is obvious from the lists herewith reproduced, the shape and size of the different lists varies greatly, the aim being to give each list the smallest and most convenient arrangement possible. None of the lists are, however, more than  $3\frac{1}{2}$  x 6 inches in size, very few of them being as large as this and most of them very much smaller. In use it is intended that they shall be trimmed closely before they are inserted in price books, when they may be attached either by one edge close to the hinge of the book, as will, perhaps, be most convenient with the larger lists, permitting the use of the entire page for memoranda, or the smaller lists may be pasted on the page in connection with the entries in regard to discounts, freights, &c. Many of the lists are so compact in arrangement as when thus inserted to leave ample room for recording quotations.

#### Wrenches.

Inches.	6	8	10	12	15	18	21
Black...	\$9.00	\$10.00	\$12.00	\$14.00	\$24.00	\$30.00	\$36.00
Bright..	10.00	11.00	14.00	16.00	26.00	32.00	38.00

Some merchants use this pamphlet for reference, checking off invoices, etc., as it gives the leading lists in a more convenient form than they can otherwise be obtained. The lists are, however, intended primarily to be cut out

#### Stove Hollow Ware.

POTS, KETTLES, ETC. (CAST IRON.)							Ground and Unground.
No.....	6	7	8	9	10	11	
Pots.....	\$0.65	.75	.85	1.00	1.25	1.75	
Kettles.....	.55	.65	.70	.85	1.00	1.40	
T Kettles.....	.75	.80	.90	1.00	1.25	....	
Spiders.....	.27	.30	.35	.40	.50	.60	
Griddles Round	.22	.25	.27	.30	....	....	
" Long..	.40	.50	.60	.75	....	....	
SCOTCH AND YANKEE BOWLS.							
No....	1	2	3	4	5	6	
Scotch Bowls..	\$0.35	.40	.45	.50	.60	.70	
Yankee Bowls.	.35	.45	.55	.65	.75	.90	

#### Glue Pots.

No.	4/0....	\$4.50	Tinned or Enamelled
3/0....	5.00		No. 2..... \$8.40
2/0....	5.50		3..... 10.26
0....	6.00		4..... 12.42
1....	6.75		5..... 14.58
			6..... 16.94

and inserted in price books, and can be used in connection with any of The Iron Age Hardware Price Books.

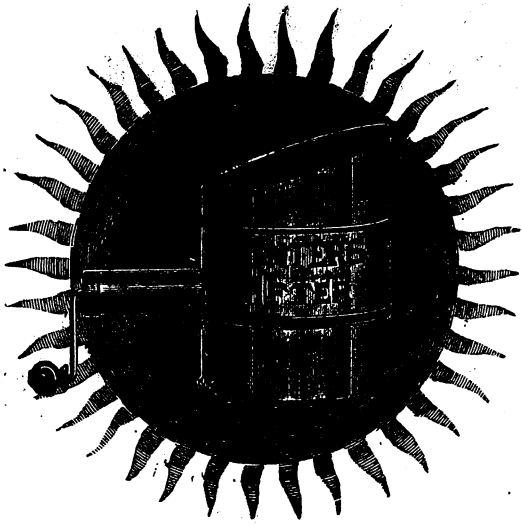
That the Standard Hardware Price Lists meet a want of the trade is evident from the fact that a new edition is already called for.

EVERY HARDWAREMAN SHOULD HAVE A COPY. Price 25 cts.

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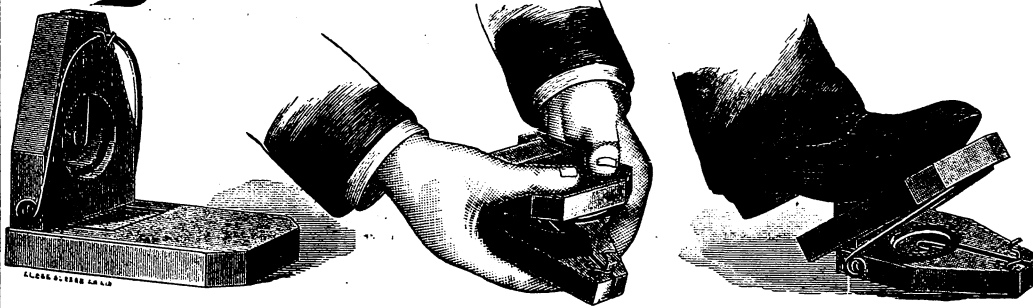
# We're all right



Now, and can fill any orders received for Hunter's Sifters, Wire and Iron Work, Hardware Specialties, promptly. Prices as usual the lowest. Write for Circulars, Catalogues, &c.

**FRED J. MEYERS MFG. CO.,**  
COVINGTON, KY.

THE "SURPRISE" SELF-SETTING RAT TRAP. PATENTED.  
BEST AND SIMPLEST TRAP IN THE WORLD.



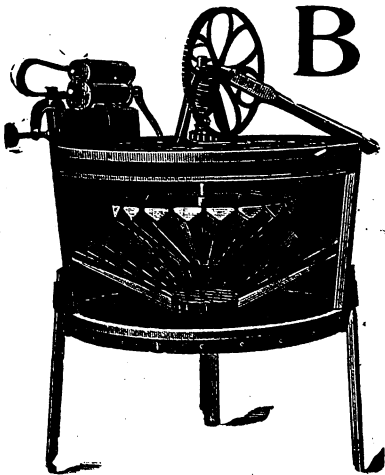
A  
Trap  
For  
Trade.

AUTOMATICALLY SET WITH THE HANDS OR FOOT.

Catches Dollars for the Seller and Rats for the Buyer.

Don't handle infringements.

The  
SUN MANUFACTURING CO.,  
SUCCESSORS TO  
THE JNO. M. WADDELL MFG. CO.,  
GREENFIELD, O.



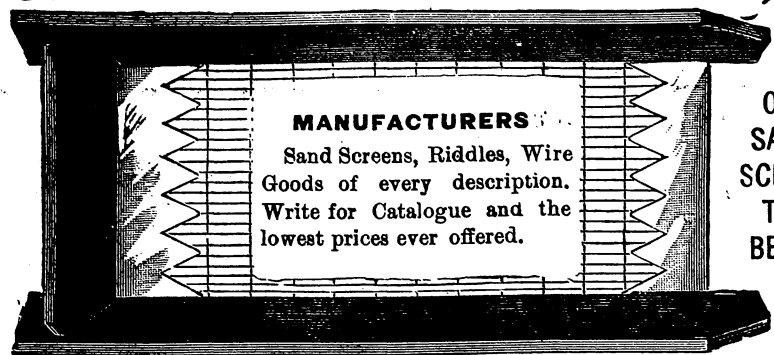
## BUSINESS

is transacted differently from what it was formerly, so is the labor of washing clothes performed differently.

The "WEISELL" is a surprise in washing clothes. Write for complete information.

**DIETHER & BARROWS,**  
Ft. Wayne, Ind.

**CINCINNATI MAN'F'G CO.,**



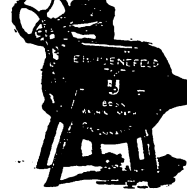
**MANUFACTURERS**  
Sand Screens, Riddles, Wire  
Goods of every description.  
Write for Catalogue and the  
lowest prices ever offered.

OUR  
SAND  
SCREEN  
THE  
BEST.

**THE CLARK MFG. CO.,**

Blind Hinges, Gate Hinges, Door Butts,  
And other **HARDWARE SPECIALTIES**  
BUFFALO N. Y.

## THE Boss Washing Mch.



An Entirely New Invention.  
Double acting, working with  
two cylinders in opposite  
directions. The greatest  
saver of household labor  
ever invented.

**E. H. HUENEFELD,**  
CINCINNATI, O.  
Send for Circular.

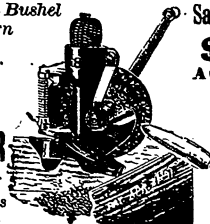
## CYCLONE CORN SHELLER.

Will Shell a Bushel  
of Corn

in 4 Minutes.

**BEST  
SHELLER**  
in the world.

All Machines  
Warranted.



Sample Sheller

**\$3.00.**

**AGENTS  
WANTED.**

Ask your  
Merchant  
for it  
Send for  
circular.

**GARRY IRON ROOFING CO.,** Sole Manufacturers  
and Owners, Cleveland O., U.S.A. Mention Iron Age

## THE KI-YI, OR DOG EXTERMINATOR.

A few drops of diluted  
Aqua Ammonia from the noz-  
zle of our Ki-Yi will reach  
the bicycle chasing dog a  
lesson he will not likely  
soon forget. It works  
like magic. As a  
rider puts it: "You  
could hear him howl  
ten squares"

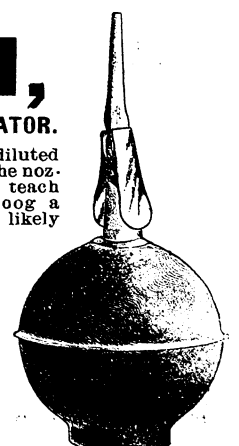
Price each, 50 cts.

Manufactured by

**A. U. BETTS & CO.,**

305 WATER ST.,

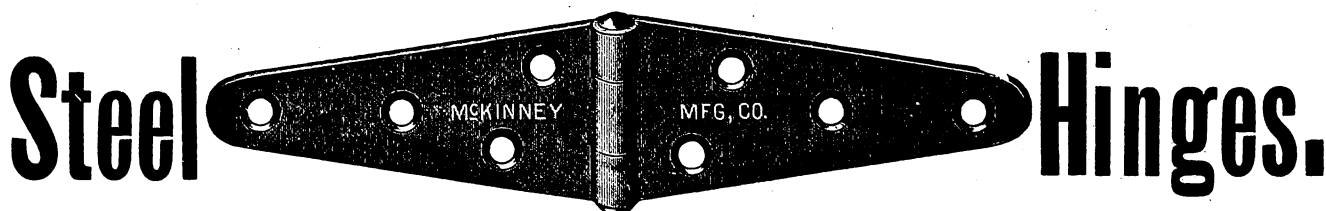
Toledo, O.



# WE CLAIM

That one pair of our Celebrated Steel Hinges will outwear two pair of the Flimsy Invention now being forced upon the attention of the trade.

## McKINNEY MFG. CO., ALLEGHENY, PA.

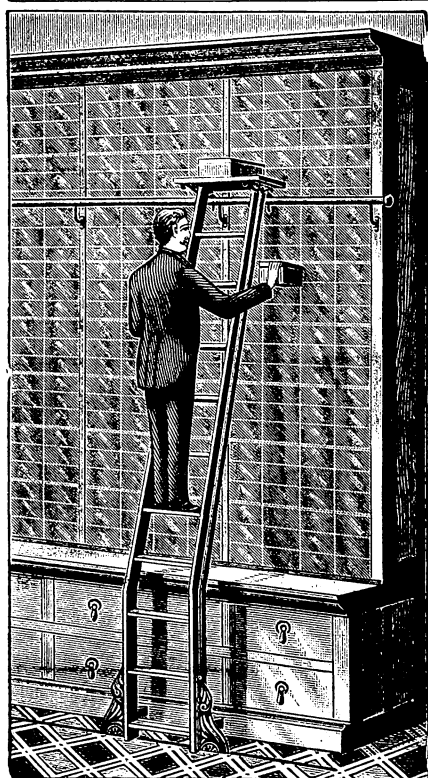


# Steel

# Hinges.

SEND FOR LIST.

"NONE BETTER."



FLOOR TRACK BICYCLE LADDER.

No other Ladder Service can approach the "Bicycle" in ease and convenience of operation. Compared with others they work like a bicycle beside a lumber wagon.

Can be applied to any kind of shelving made.

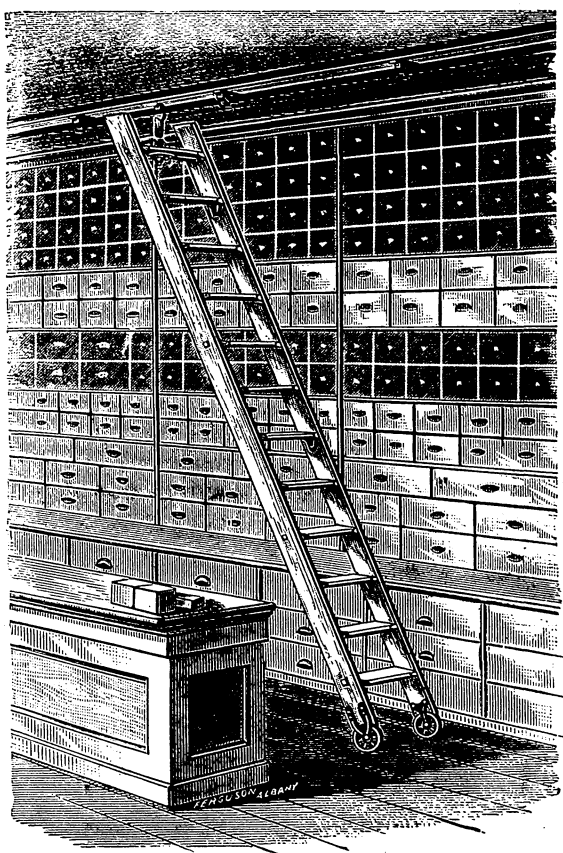
See this space next week for other styles.

Send for Illustrated Catalogue and prices to

THE BICYCLE STEP LADDER CO.,

184 & 186 Clark St., Chicago, Ill.

## THE "NOISELESS" STORE LADDER.



The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by

# M. CROISSANT,

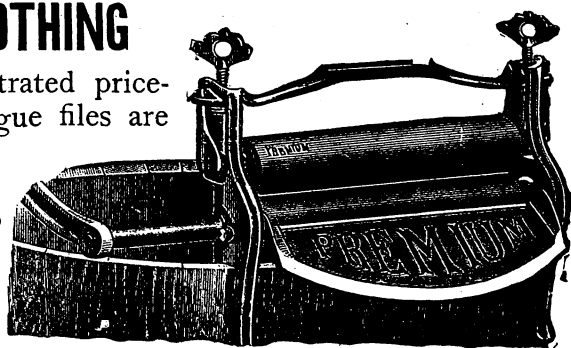
ALBANY, N. Y.

THE ONLY GENUINE SOLID CASE. CUTS AWAY ANTI SPLITTING. IS HELD MORE SECURELY. DOES NOT REQUIRE SCREWS. HAS NO FACE PLATE. NO CHISELING REQUIRED. NO SPECIAL TOOLS REQUIRED. NO COUNTERSINKING FOR FACE PLATES. MILLIONS SOLD. THE BEST, TOO. IT IS THE SASH PULLEY WITH 1/4" STEEL AXLES.

EMPIRE PORTABLE FORGE CO. LANSINGBURGH, N. Y.

## IT COSTS NOTHING

to send for our illustrated price-list, and your catalogue files are incomplete without it. Write to the Factory, Montpelier, Vt., or to our Chicago store, 68 Lake St.



COLBY WRINGER COMPANY.

TEMPORA MUTANTUR ET NOS MUTAMUR IN ILLIS.

# WROUGHT STEEL DOOR LOCKS.

Wrought Steel Cases.

Wrought Steel Fronts.

Wrought Steel Bolts.

They

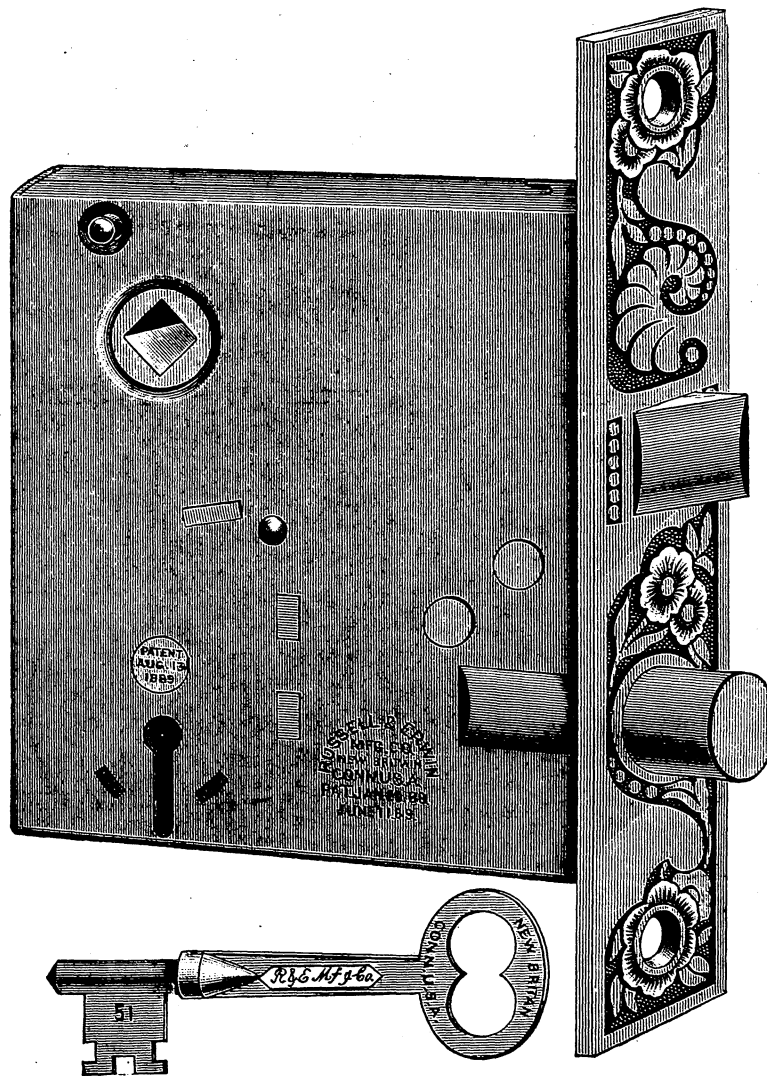
Excel in

Finish,

Lightness

and

Strength.



No. 7726, Bronze Plated, Wrought Steel Front.

Wrought Steel Springs.

Wrought Steel Tumblers.

Wrought Steel Keys.

## RUSSELL & ERWIN MANUFACTURING CO.,

Sole Manufacturers,

NEW BRITAIN, CONN.

NEW YORK.

PHILADELPHIA.

BALTIMORE.

LONDON



# "VASSAR" CYLINDER LOCKS

Are the SAFEST and BEST.

## Our Cylinder Locks

are made in various  
sizes from

3½ to 7½ Inches,  
With 1 or 2 Cylinders.

## They are

adapted for use on  
Front, Vestibule and In-  
side Doors of Fine  
Residences, Store  
Doors, Public and  
Office Buildings, Hos-  
pitals, Asylums, etc.

## Art Hardware.

Plain and orna-  
mental in many

## NEW DESIGNS.

Complete Lines of

FINE

House Trimmings

IN

GENUINE BRONZE

AND

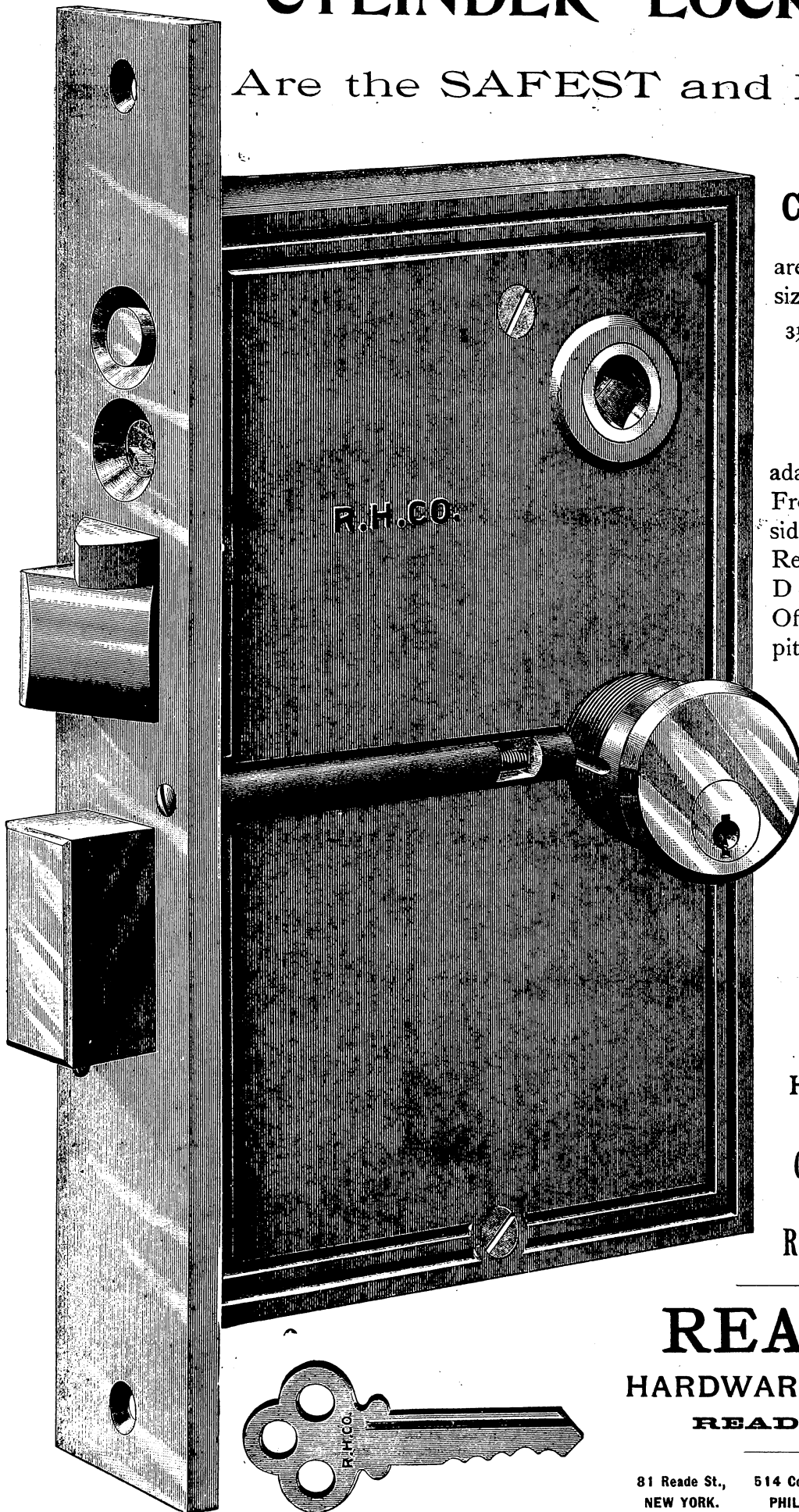
RUST-PROOF IRON.

**READING**  
HARDWARE COMPANY,  
READING, PA.

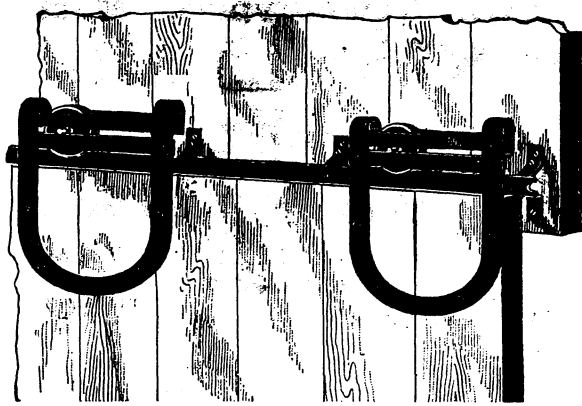
81 Reade St.,  
NEW YORK.

514 Commerce St.,  
PHILADELPHIA.

73 Wabash Ave.  
CHICAGO.







## Lane's Patent Steel Barn Door Hangers,

"O. N. T." Track for same.

The first Anti-friction Steel Door Hanger placed upon the market and to-day stands as the original and best. Sold in all the States of the Union, as well as abroad. Also Lane's Noiseless Steel Parlor Door Hanger, using Single Steel Track, a great success.

Lane's Pat. Self-measuring Faucet, measuring liquids as drawn.  
Swift's Coffee Mills in great variety.

Manufactured by **LANE BROS.**, Poughkeepsie, N. Y.

JOHN H. GRAHAM & CO., General Agents, 113 Chambers St., NEW YORK.

# THE KEYLESS LOCK CO.

197 SOUTH CANAL STREET, CHICAGO,

Manufacturers of

## The Craig Anti-Dial Combination Locks.

For use on Houses, Stores, Desks, Drawers, Lockers, etc.

We Protect the Hardware Trade.

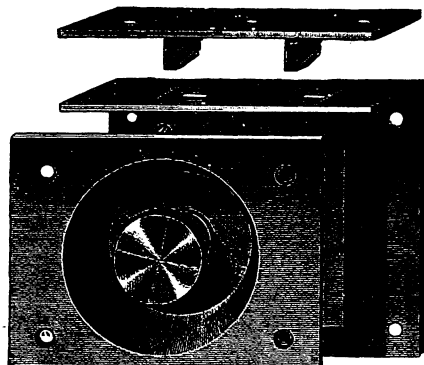
We Appoint No Agents.

These Goods Will Not Stay on Your Shelves.

All inquiries from consumers are referred to Hardware Dealers who keep our Goods. (See our "ad" in Century, Scribner's and Harper's.)

WE GUARANTEE EVERY LOCK.

DROP US A POSTAL AND GET OUR CATALOGUE AND TRADE PRICES.



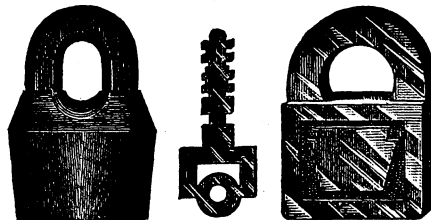
$\frac{1}{2}$  Size.

Chest Lock, No. 120.

### KEYSTONE LOCK WORKS,

— Established 1879. —

E. T. FRAIM, Lancaster, Pa., U. S. A.  
MANUFACTURED BY



Patent Inter-Locking Tumbler Scandinavian or Jall PADLOCKS, in 56 grades and sizes. Key and Self-Locking. Brass, Bronze, Steel and Malleable Iron. Red, Black, Bower-Barff and Bright Brown finish. Also a full line of fine flat padlocks in Bronze and Steel. All fully described and illustrated in our new catalogue, furnished free to the trade.

SURPLESS, DUNN & ALDER,

General Agents, 97 Chambers St. New York.

### HARDWARE DEALERS

CAN RECOMMEND THE

## CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for Sash Cords, very strong and lasting (some in daily use ten years), and gives thorough satisfaction wherever used. The patented attachments are very simple and can be applied to any window.

MANUFACTURED ONLY BY

"THOMAS MORTON"

65 Elizabeth Street,

Write for Prices.

NEW YORK.

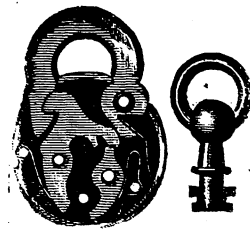
## PATENT PERFECTION PADLOCK

Eight Tumblers. Key Turning Both Ways.

Sizes;  $\frac{1}{4}$  inch to  $2\frac{1}{4}$  inches; of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also,  $\frac{1}{2}$  and  $\frac{3}{4}$  inch Padlocks, opened with a common pin, in brass and nickel; for cats and small dogs. The best Railroad Switch and Car Lock in the world. Adopted by the United States Treasury for bonded warehouses.

AMES SWORD CO., Chicopee, Mass.

Send for Price Lists and Circulars.



## Merit Always Wins.

## THE CALDWELL SASH BALANCE

Has been the standard for five years.

Write for our new catalogue of Hardware Specialties.

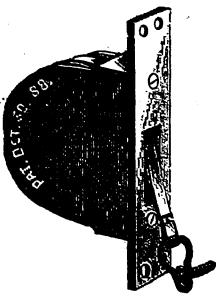
CALDWELL MFG. CO., Rochester, N. Y.

READING HARDWARE CO., Agents.

81 Reade St., New York.

514 Commerce St., Philadelphia.

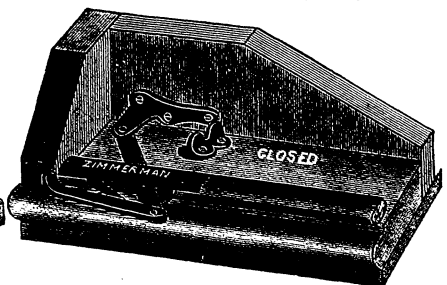
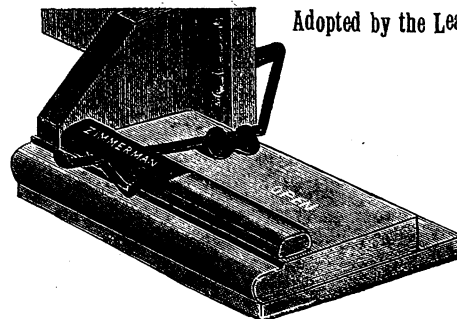
73 Wabash Ave., Chicago.



### ZIMMERMAN'S NEW AUTOMATIC INSIDE SHUTTER WORKER.

Adopted by the Leading Architects of the Country.

Beware of Infringement



—FOR SALE BY—

TYSON & ZIMMERMAN,  
W. H. JACOBUS,  
SARGENT & CO.,  
BIDDLE HDW. CO.,  
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SIMMONS HDW. CO.,

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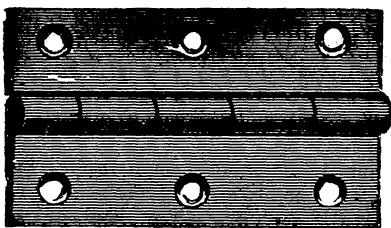
CINCINNATI.

CHICAGO.

CLEVELAND.

LOUISVILLE.

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## Cast Brass Butt Hinges

IN STOCK AND FOR SALE BY

**W. & J. TIEBOUT,**

Nos. 16 & 18 Chambers Street, New York.

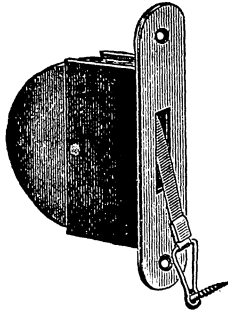
MANUFACTURERS OF

**BRASS, GALVANIZED & SHIP CHANDLERY  
HARDWARE.**

## MONEY, TIME and LABOR SAVED

When you build if you will  
use our Steel Frame Sash  
Balance.

**NO EXPERIMENTING.**



We have made  
them 7 years. They  
require no box frames

Applied as easily  
as a common pulley.

Costs less money  
than weights and cord

We guarantee  
them 10 years.

Ask your Hardware Dealer for the Pull-  
man Steel Frame. Don't accept imitations.  
**PULLMAN SASH BALANCE CO.,** Rochester, N. Y.  
New York Office, 142 Chambers St.  
Chicago Office, 235 Lake St.

## COMMON SENSE SASH BALANCE.



The Best and most Practical  
substitute for weights invented.  
The most Durable, the Cheap-  
est and best device for all  
ordinary windows. Balances  
when in position are out of  
sight. No rivets, bolts or  
screws are used in putting it  
together, so that nothing can  
get out of order or need repair-  
ing. No cutting, boring or  
marring the sash, as the Bal-  
ances are let into the jamb.

Manufacturers of Sash Balances, Sash  
Locks, Sash Lifts, Monitor  
Sad Irons.

**STEWART & BAKER,**

197 State Street, Rochester, N. Y.

No more **Slamming!**  
...Doors!

Our Combination

**Door Check  
Lock and  
Bumpers**

Holds  
door  
in  
any  
position

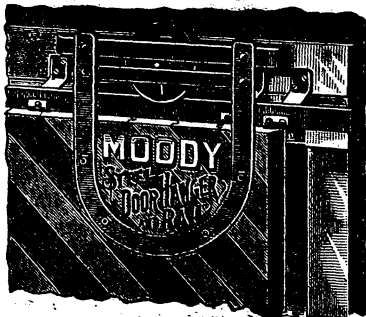
For sale by all Jobbers. Write  
for Circulars.

**Unity Door Check Co.,**  
81 Dearborn St., Chicago, Ill.



Why Band Saws Break. Sixteen reasons and  
how to avoid them. Being instructions to filers  
on the care of large band-saw blades used in  
the manufacture of lumber. By JOSHUA OLD-  
HAM. 90 pages, illustrated, cloth. \$1.00  
For Sale by David Williams, 96-102 Reade St., N. Y.

## VICTOR MFG. CO., Newburyport, Mass. STEEL RAIL.



Showing one-half set of hangers attached  
to door.



The Only Bracing Bracket Made.

HANGERS.	PRICE-LIST.	Per Doz. prs.
No. 5, to run 6 feet, 3 1/4 in. wheel,	-	\$10.00
No. 6, to run 10 feet, 4 1/4 in. wheel,	-	15.00
No. 7, to run 15 feet, 5 1/4 in. wheel,	-	22.00
RAIL, per foot.....		6 1/2 cents.



Patented  
May 13, 1880.

Per Doz. pr.  
No. 1, 5 foot run, \$15.00  
" 1 1/2, 8 " " 18.00  
" 2, 10 " " 22.00  
" 3, 15 " " 28.00  
Double Braced Steel  
Track, 4, 6, 8 and 10 feet  
lengths, 10c. per foot.

We are the original makers of steel covered hangers and all others are imitations.  
Beware of infringements, as we shall protect our rights.

In our Steel Covered Hangers we have all the desirable features of the Best Hangers in the market, and  
with that we combine the cover for wheels SO NO ICE OR SNOW can reach the wheels, and making this  
cover as we do, we stiffen it so it is the strongest Hanger in the market, and we believe it is just perfect.  
Would be glad to have you try a small order and satisfy yourself.

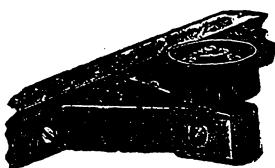
## Double-Braced Steel Rail.



PATENTED JUNE 12, 1888.

This rail being double-braced and double-riveted is the strongest rail in the market. Being braced both  
ways it will not sag. The joint is made so it is perfectly solid. It comes complete and ready for use, requir-  
ing only screws and screw driver for any man or boy to put it up in short order. It can be used for any  
grooved wheel Hanger, and a heavy door will not make it spring or tremble. Guaranteed to hold a door  
weighing 2,000 pounds, and used in connection with our Anti-Friction Hanger will work perfectly on large or  
small doors.

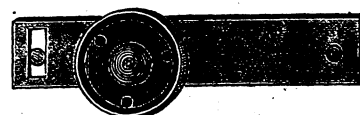
### Cronk's Adjustable Stay Roller.



Made of wrought steel strap; cast block with slot  
adjusted by loosening bolt.

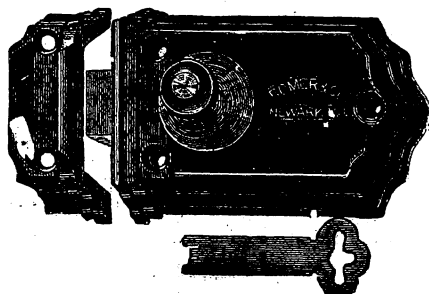
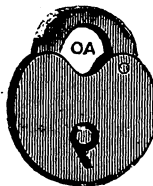
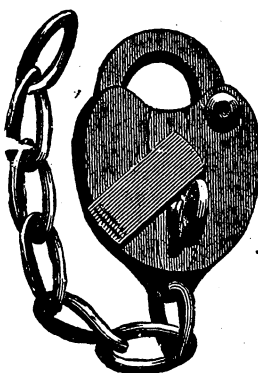
Pacific Coast Agents, CHAS. L. PIERCE & CO., San Francisco, Cal.

### Cronk's Inside Adjustable Stay.



Is cheap, simple and durable, and much better than  
a cleat nailed on the floor for this avoids all friction  
and leaves no place for dirt to accumulate. \$2.00 per  
doz. No inside door can be properly hung without  
this stay.

## ROMER & COMPANY, Manufacturers of PATENT JAIL LOCKS, BRASS and IRON PADLOCKS,



Adjustable Door Knobs and Trimmings,  
Front Door Handles.

Patent Horizontal Rim Cylinder Reversible Night Latches.

Illustrated Lists sent to the Trade on application.

275, 277 and 279 Passaic St., near Erie and D. L. & W. R. R. Depots, Newark, N. J

Crown and Giant Sash Cord and Bell Cord. Braided and Twisted Picture Wire  
Spool Wire, Clothes Lines, Ventilator Cords, Garden Lines, Chalk Lines, Annun-  
ciator Wire.

✻ Send for Catalogue, Samples, Prices. ✻

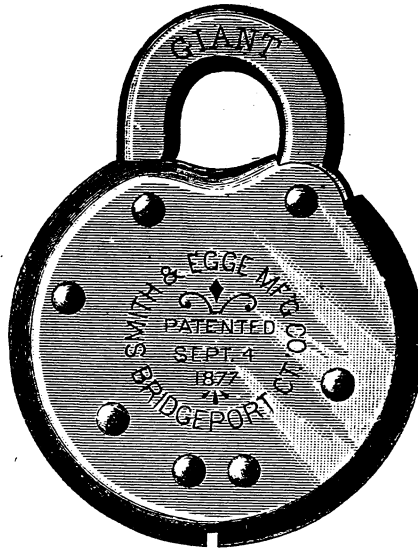
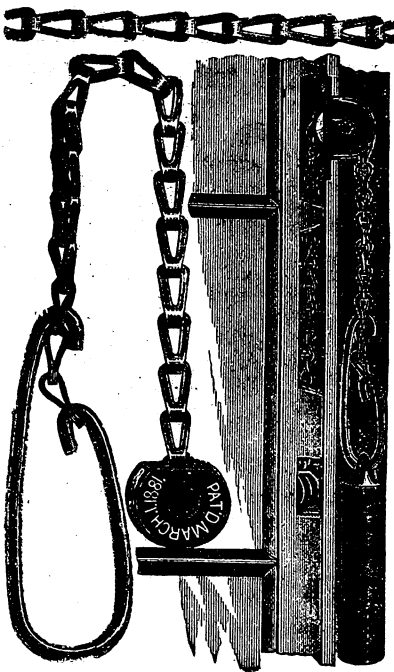
Bright Wire Goods, Picture Nails, Knobs, Hooks, Chain, Clothes Line Pulleys, etc.

—MANUFACTURED BY—

**OSSAWAN MILLS CO.,** Norwich, Conn.

**PERKINS "BOSS" HUSKERS****and Hand Protectors.**∴ **JOBGING TRADE SOLICITED.** ∴

—MANUFACTURED BY—

**H. H. PERKINS MFG. CO.,****96 Trade Street, Kewanee, Ill., U. S. A.****THE SMITH & EGGE MFG. CO.****BRIDGEPORT, CONN.****THE GIANT PAD LOCK.**

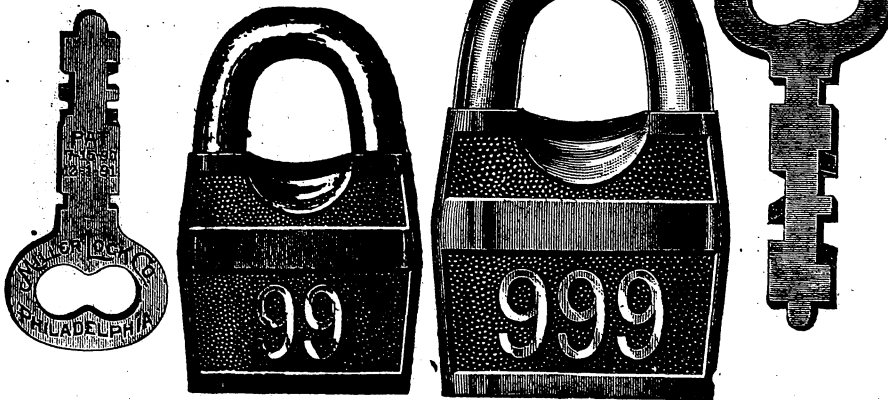
Centennial Award. "Superior in Every Respect"  
This is one of the best selling locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited.

**THE GIANT METAL SASH CHAIN**

is a substitute for cord in hanging weights to windows. It is manufactured by us only, and by automatic machinery, patented and owned exclusively by ourselves, and whereby we secure uniformity of construction and quality. We have been to great expense in producing a metal having all the qualities and conditions requisite for making suitable chain for this purpose, and to prevent other chain of the same pattern of link and of the same general appearance, but made from an inferior metal, being offered as the same thing, we patented the word "Giant" as a Trade-Mark, as applied to either metal or chain. Trade-Mark Registered April 16, 1878, and October 22, 1878, and our metal is therefore known in the market as "Giant Metal," and our chain as "Giant Metal Sash Chain."

**THE HANDSOMEST AND BEST****JAIL PADLOCKS IN THE MARKET.**

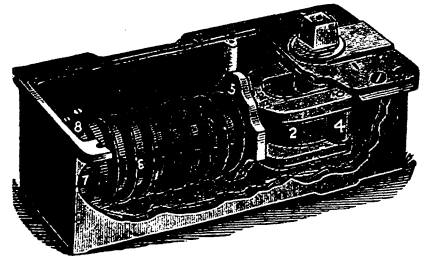
Cast Bronze.  
2" Nickel Plated Steel Keys each.  
4" Honest Tumblers each.



The Parts are MACHINE MADE, accurately fitted, durable and secure. Liberal discounts to the trade render these the cheapest fine Jail Padlocks in the market.

For sale by the best Jobbing Houses and by all live Retailers.

No.	Weight, 1/4 lb.	2-Keyed, 4 Tumblers,	PRICE, PER DOZEN.
99,	1/4	2	\$6.00
999,	1/2	4	8.00
For Chain attached, add			2.00

**MILLER LOCK CO., SOLE MANUFACTURERS, FRANKFORD, PHILADELPHIA, PA.****CHECKING SPRING HINGES FOR SWING DOORS.**

Applied in floor under door. They close the door gently, without noise or violence and stop it at once at the centre. Doors cannot sag, springs do not break or set.

**J. BARDSLEY, 149 & 151 Baxter St., New York.**

Illustrated Price-List on Application.

**HAY KNIVES**

SEASON OF 1892-93.

**"LIGHTNING"**

(Reg. Trade-Mark No. 9583.)

**"BLIZZARD"**

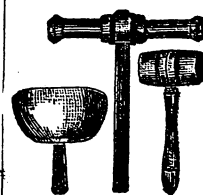
Reg. Trade-Mark No. 19,390.

It pays to handle **FIRST CLASS** goods.

Write us early for prices and terms.



Sole Manufacturers,

**The HIRAM HOLT COMPANY, EAST WILTON, MAINE.****N. Y. MALLET AND HANDLE WORKS.**

MANUFACTURERS OF **MALLETS.**  
Also Cotton and Bale Hooks.

Patented Feb. 13, 1877, a new combination of Hooks.  
**456 E. HOUSTON ST., New York City.**

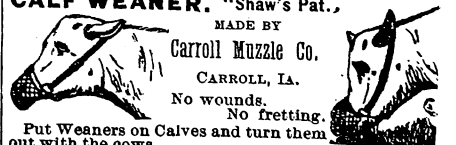
**CALF WEANER. "Shaw's Pat.,**

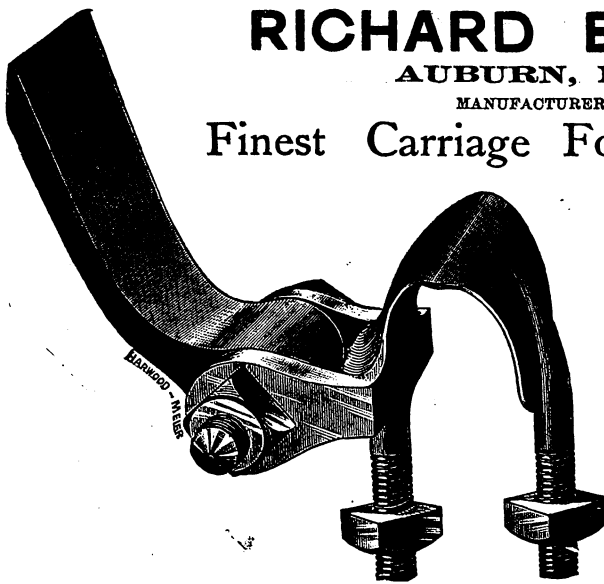
MADE BY  
**Carroll Muzzle Co.**

CARROLL, IA.

No wounds.  
No fretting.

Put Weaners on Calves and turn them out with the cows.  
"It is the only machine I ever had that worked perfectly in every way."  
**A. R. ANDERSON, County Supervisor.**





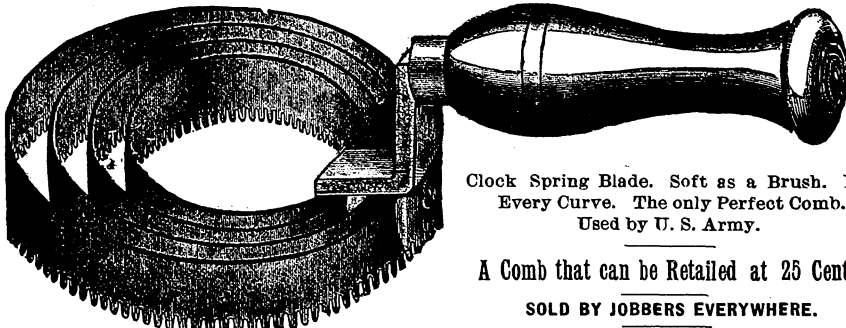
## RICHARD ECCLES,

AUBURN, N. Y.,  
MANUFACTURER OF

Finest Carriage Forgings, Couplings, Clips, King Bolts, Fifth Wheels, &c. Manufacture a full line. Special Drop Forgings.

Send for Catalogue.

## The Spring Curry Comb.



Clock Spring Blade. Soft as a Brush. Fits Every Curve. The only Perfect Comb. Used by U. S. Army.

A Comb that can be Retailed at 25 Cents.

SOLD BY JOBBERS EVERYWHERE.

Manufactured by the **SPRING CURRY COMB CO.,**  
117 to 119 S. Lafayette St., SOUTH BEND, IND.

## THE "HUMANE"

Pat. Jan. 6, '91, Nov. 22, '92.



Is the ONLY Curry Comb fit to use on Horses' Legs or on CLIPPED or SHORT-HAIRED Horses. It is IMPOSSIBLE to hurt a horse with it. Every Horse owner ought to possess one for its MATCHLESS qualities as a Shedder, as well as for the purposes mentioned.

It is WONDERFUL in operation, PEERLESS as a self-cleaner, PERFECT in construction, a SURPRISE to Groom and Horse, and HUMANE to the Touch. BUY ONE and You will Never Again be without.

Sample, Postpaid, 24 cents.



Sample, Postpaid, 30c.

## MAGIC OSCILLATING CURRY COMBS.

SELF-CLEANING, FLEXIBLE  
SPRING STEEL BLADES.

Polished Handle. Malleable Iron Back.

A Great Seller. Try it.

**F. E. KOHLER & CO.,** Manufacturers Hardware Specialties, **Canton Ohio.**  
J. C. McCARTY & CO., General Agents, 97 Chambers St., New York City.



## WORTHLEY'S "SLOW FEED" MANGER.

"A Great Teacher." "A Good Scheme." "A New Idea."

The seven one-pint cells prevent waste and bolting. Used by Boston Veterinary Hospital and 5000 others. 17 inch, 25 lb. size, price, \$1.60.

They nest together easily. Freight Rates are extra low. Shipped from New York, New Haven or Boston f.o.b. Discounts Liberal. Send for Catalogue of Hay Racks, Guards, &c.

WORTHLEY'S BROAD GAUGE IRON STALL WORKS, 53 Elm St., Boston, Mass.



## FROST'S ANTI-RATTLER

Pat. Jan. 20, 1880.

Out One-half Size.

Sample pair sent to any hardware or saddlery firm by addressing

The Frost Thill Spring Co.,  
Boston, Mass.

## THE WILCOX & HOWE COMPANY,

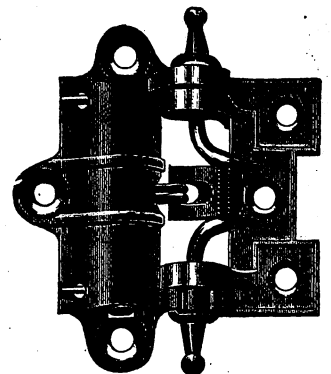
BIRMINGHAM, CONN.,  
MANUFACTURERS OF

A Full Line of Carriage Hardware  
ALSO SPECIAL FORGINGS.

Estimates cheerfully given. Send for Catalogue

## NEW IDEA SPRING HINGE

Holds the door strongest when closed.



Resistance gradually decreases in opening

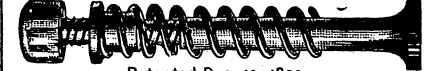
and increases in closing the door.

A covered (patented) hold-back Spring Hinge. Full particulars, free Sample and Prices by mentioning this paper.

## STOVER MANUFACTURING CO.,

145 River St., Freeport, Ill.

## Motley's Adjustable Sash Holder



Patented Dec. 13, 1892.

For Windows, New or Old.

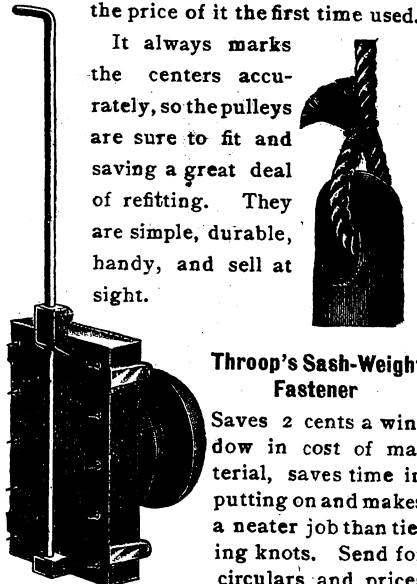
In Buildings, Cars, Steamboats, Carriages, etc. Also for Window Screens and Sliding Blinds. Send for Descriptive Circular.

P. MOTLEY, 750 S. Broad St., Philadelphia, Pa.

## Grennan's Sash Pulley Marker for Common Sense Sash Pulleys.

Will mark in ten minutes what would take five hours to do the old way, saving the price of it the first time used.

It always marks the centers accurately, so the pulleys are sure to fit and saving a great deal of refitting. They are simple, durable, handy, and sell at sight.



## Throop's Sash-Weight Fastener

Saves 2 cents a window in cost of material, saves time in putting on and makes a neater job than tying knots. Send for circulars and prices

J. W. Skelly & Son, - BRISTOL, CT.

# COVERT MFG. Co.

West Troy, N. Y.



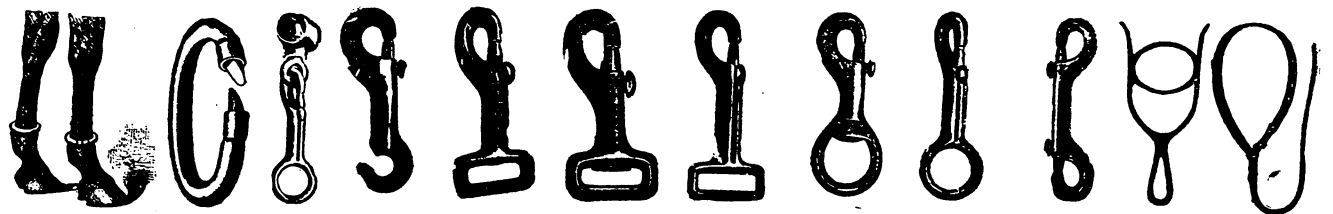
$1\frac{1}{4} \times \frac{1}{2}$

$1\frac{1}{2} \times \frac{1}{2}$

$1\frac{1}{8} \times \frac{1}{2}$

## COVERT'S

*Horse and Mule Jewelry.*



—THIS IS THE—

## Great Covert Snap



Covert's "New" Snap.

The Best and Cheapest, First-Class Snap in the Market.



COVERT'S CELEBRATED HARNESS SNAPS, CHAIN GOODS, ROPE AND WEB GOODS ARE SOLD BY ALL LEADING JOBBERS AT MANUFACTURERS' PRICES.

# COVERT MFG. CO.,

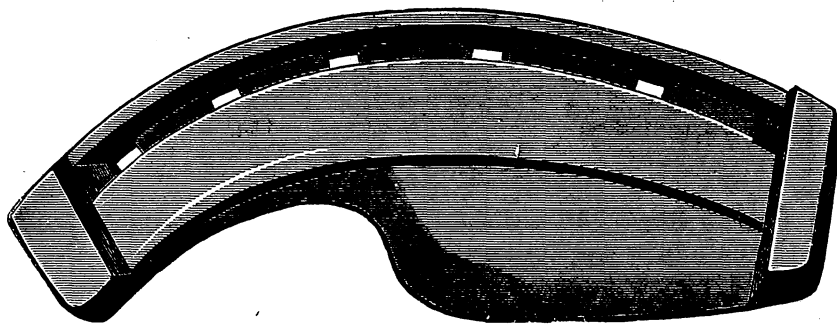
WEST TROY, N. Y.

# SCRANTON FORGING CO.,

SCRANTON, PA.

## CARRIAGE HARDWARE AND SPECIAL DROP FORGINGS.

FORGED  
OX  
SHOES.



Made under Deeble's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.

## Mount Carmel Steel Toe Calk Ox Shoes.

The Best and Cheapest in the World.



Blunt Calk. Seven Sizes.

**Warranted**  
to outwear  
any shoe made.

WRITE FOR PRICES.



Sharp Calk. Six Sizes.

**Walter W. Woodruff & Sons, Mount Carmel, Conn., U. S. A.**

## BURDEN'S HORSE SHOES.

"Burden Best"

Iron.

Boiler Rivets.

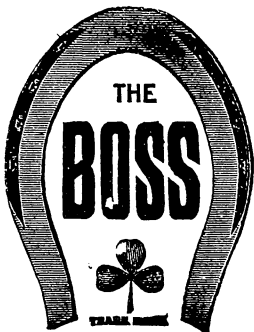
**THE BURDEN IRON CO.**

TROY, N. Y.

**Standard Horse Shoe Co.,**  
Manufacturers of  
**HORSE AND MULE SHOES.**

LEEDS, ROBINSON & CO., General Agents,

75 North Street, Boston, Mass.



## HORSE AND MULE SHOES.

Superior Quality, Shape and Finish.

**BRYDEN HORSE SHOE CO.,**

CATASAUQUA, PA.

**RHODE ISLAND PERKINS HORSE SHOE CO.,**

MANUFACTURERS OF

**Horse and Mule Shoes of the Perkins Pattern.**

SPECIALTIES:—X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.

Works at Valley Falls, R. I.

Office, 31 Exchange Place, Providence, R. I.

F. W. CARPENTER, Pres.,

C. H. PERKINS, Gen. Manager,

R. W. COMSTOCK, Sec'y,

CHARLES R. STARK, Treas.

J. C. McCARTY & CO., Agents - 97 Chambers Street, New York.

## THE NEW DIAMOND STATE HORSE AND MULE SHOES.

JUST TRY THEM and YOU will say they excel all others.

MANUFACTURED BY

**DIAMOND STATE IRON CO.**  
WILMINGTON, DELAWARE.

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blank Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.

PHILADELPHIA OFFICE,  
208 So. Fourth St.

{Correspondence invited}

NEW YORK OFFICE  
11 Pine St.



# H. D. SMITH & CO.,

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

## CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

# FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of

# CHAMPLAIN

Manufactured by the NATIONAL HORSE NAIL CO.,  
VERGENNES, VERMONT.

All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents. New York.



Elegant Iron.  
Beautiful Shape.  
HORSE SHOES,  
*Light, Medium and Heavy.*  
MULE SHOES,  
*Light, Medium and Heavy.*

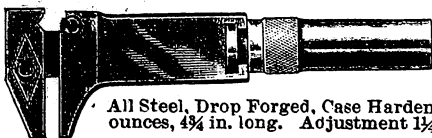
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OLD DOMINION IRON AND NAIL WORKS CO.,

ARTHUR B. CLARKE, President.

Chicago Office, 45 La Salle St.

Richmond, Va., U. S. A.



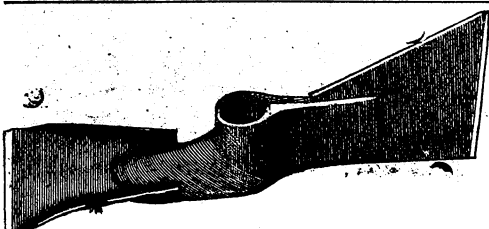
Diamond  Cycle Wrench,  
WITH SPOKE GRIP ATTACHMENT.

All Steel, Drop Forged, Case Hardened. Lightest, neatest and strongest. Weighs 5 1/4 ounces, 4 3/4 in. long. Adjustment 1 1/4 in. Write for prices and descriptive circular.

Manufactured by the

GENDRON IRON WHEEL CO.,

Sold by all Cycle and Hardware Dealers.  
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"THE EUREKA LAWN MATTOCK"

Is designed as a tool for many purposes, such as trimming paths, drives, cutting brush, weeds, thistles or ice, loosening up hard earth in gardens or flower-beds, etc., etc. It has steel blades cast in the head and is one of the most convenient tools for general use ever made, its price bringing it within the reach of all. Address

THE RAILWAY SPEED RECORDER CO.,  
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P. F. BURKE, C. F. DEWICK & CO.  
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TOE-CALKS.  
—ALSO—  
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HORSESHOERS'  
FOOT VICE.  
Send for Circulars.  
360 Dorchester Av. Die for Welding  
BOSTON, MASS. Sharp Calks.



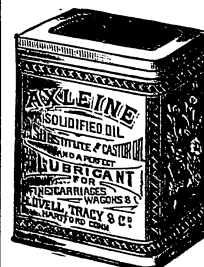
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PHOENIX HORSE SHOE CO.

POUGHKEEPSIE, N. Y.

New York Office, No. 66 Reade Street.

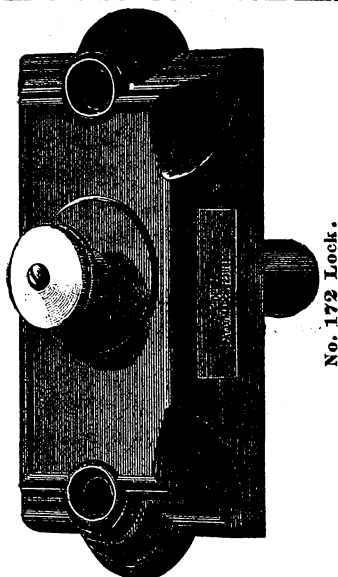
## AXLEINE



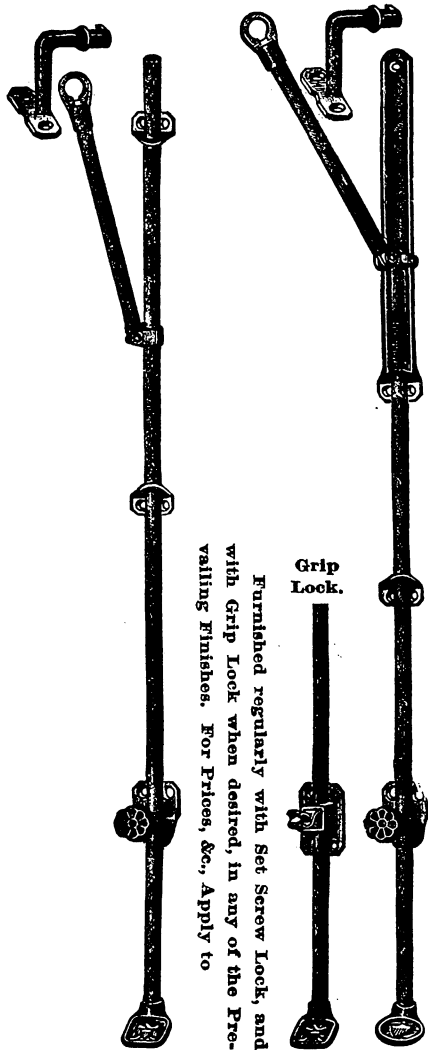
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Send for sample and prices.

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Factory, **BROOKLYN, E. D., N. Y.**

**TRANSOMLIFTERS****"EAGLE."****"SHIELD."**

Furnished regularly with Set Screw Lock, and  
with Grip Lock when desired, in any of the Pre-  
vailing Finishes. For Prices, &c., Apply to

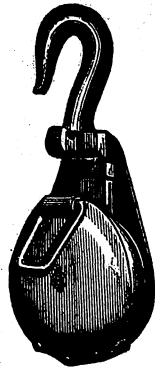
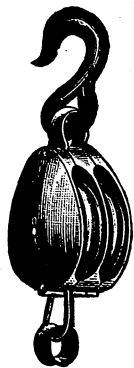
**Grip  
Lock.**

**J. F. WOLLENSAK, PATENTEE**  
**CHICAGO, ILLINOIS.**

**SASH WEIGHTS**

**E. E. BROWN & CO.,**  
McKean and Meadow Sts.,  
**PHILADELPHIA, PA.**

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**The Cleveland Block Co.**

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**ARE BETTER IN EVERY WAY.**

No waste material. Every ounce of weight in the line of  
strength. No clumsy outside straps or bolts. As light as  
wooden blocks and vastly more durable. They wear, but never  
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## NOW IS THE TIME TO PLACE YOUR ORDERS FOR HAY BLOCKS.

**Our Self-Oiling Blocks**

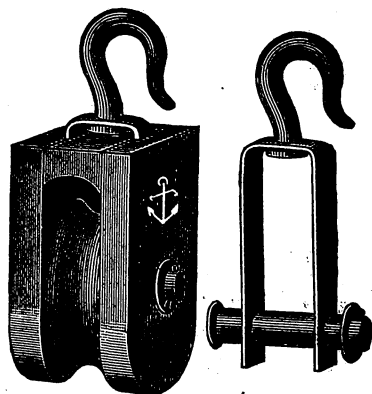
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hard wood shells; wrought iron straps; forged  
steel hooks and hollow wrought iron axles per-  
forated.

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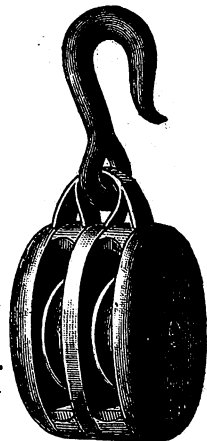
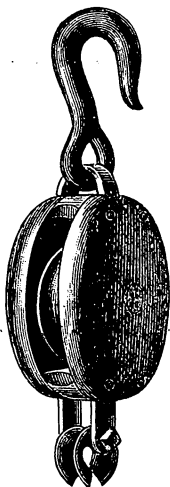
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H. B. NEWHALL CO., 105 Chambers St., N. Y. } Agts.  
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**TOLEDO BLOCK WORKS,**  
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WILL PROVE SATISFACTORY  
TO **USER.**

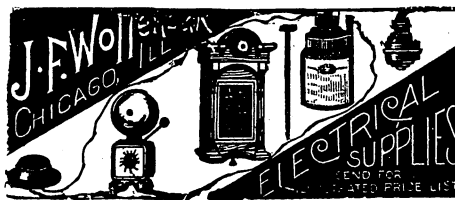


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118 North Delaware Avenue,  
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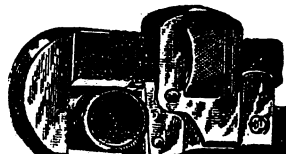
This Wrench can be furnished with Short Nut.

## COMBINATION WRENCH.

Case-Hardened Throughout. Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the requisite combinations of a regular Nut Wrench, thus making a combination which has no equal. For Circulars and Price-List, address

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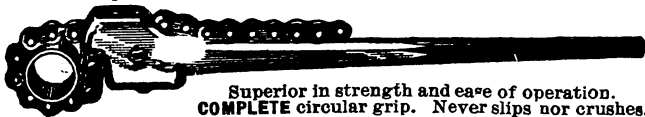
## TRIMO PIPE WRENCH,

Forged Steel.

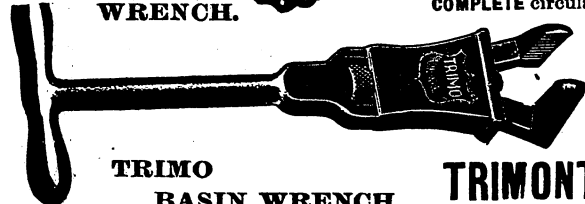
All parts interchangeable.

Grips firmly without loss of motion, Releases readily. Never locks, Causes no trouble in close quarters. Does not crush the pipe.

TRIMO  
CHAIN  
PIPE  
WRENCH.



Superior in strength and ease of operation. COMPLETE circular grip. Never slips nor crushes.



TRIMO  
BASIN WRENCH.

Can be used with one hand and in closer quarters than any other Basin Wrench. Parts interchangeable.

TRIMONT MFG. CO., ROXBURY MASS.

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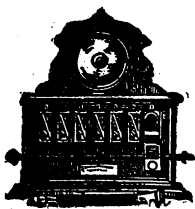
This Surface Gauge is drop forged, of bar steel, and finished in a thorough manner, and hardened.

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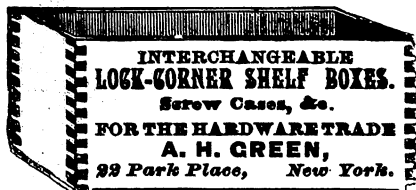
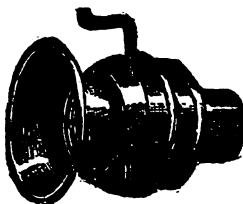
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Highest testimonials from those in use. Wholesale agents wanted in every city. Correspondence from Truck Manufacturers solicited. Circulars, price-lists and full particulars furnished.

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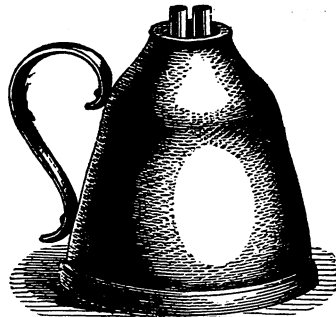
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SCREW, KEROSENE SIZE.

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NEW pattern Heavy Screw Clamps, strongest in the Market.

For sale by all the principal Hardware Dealers.

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Of superior quality, and Hardware Specialties in Malleable Iron made to order.

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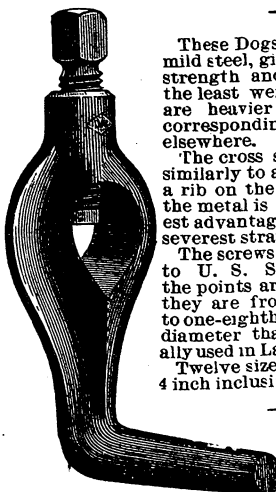
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(Schlenker's Patent).

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## STEEL LATHE DOGS.



These Dogs are forged from mild steel, giving the greatest strength and toughness for the least weight, while they are heavier than Dogs of corresponding sizes made elsewhere.

The cross section is shaped similarly to an ogee, forming a rib on the back, by which the metal is utilized to greatest advantage at the point of severest strain.

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Twelve sizes, from  $\frac{3}{8}$  inch to 4 inch inclusive.

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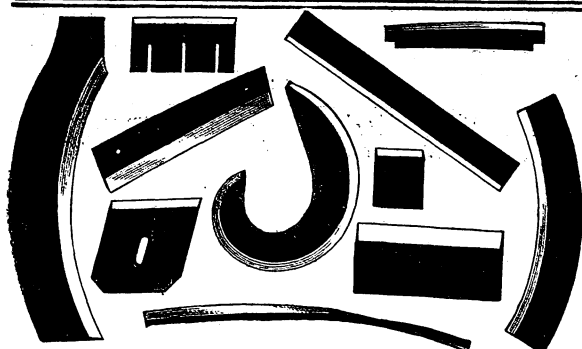
STANDARD AND SPECIAL DROP-FORGINGS

—MAKERS OF—

Brock's Patent Chain Pipe Wrench,

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BROOKLYN, N. Y.



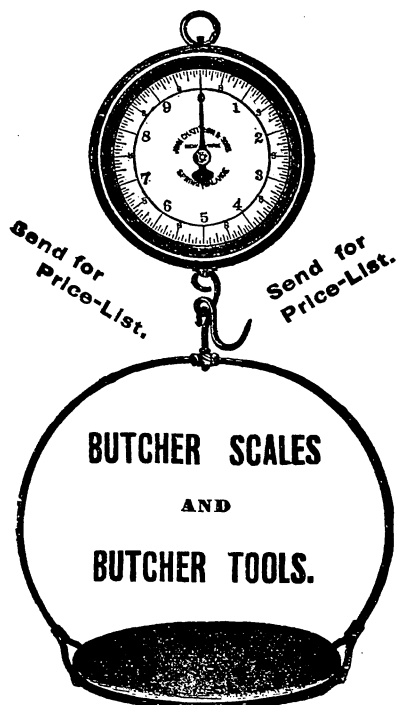
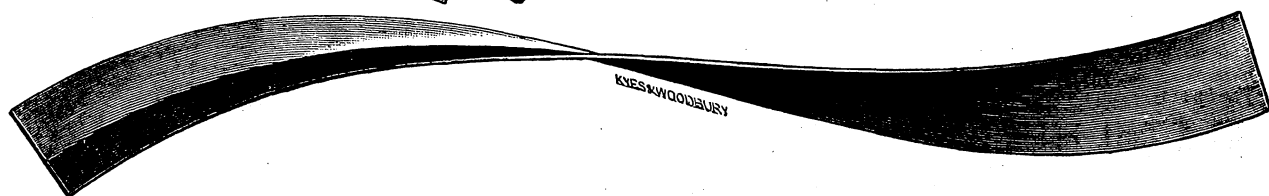
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**CAPITOL MFG. CO.,**

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**HERCULES.**  
Bright Finish.



**HERCULES.**  
Combination Pipe Bolt and Nut Wrench. Bright Finish



The Hercules Screw Driver and Tack Claw (Patented).  
This Screw Driver is made from one piece of special cast steel, in all sizes, from 1 1/4 in. to 12 in. The blade is well polished, carefully tempered, and every screw driver is subjected to a severe test and warranted. Handles Japaned with the best quality baking Japan.  
**The Strongest and Most Durable Wrench and Screw Driver Made.**  
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FOR ANTHRACITE AND BITUMINOUS MINING  
6 DIFFERENT STYLES OF SPOUTS.  
SEAMLESS BRASS COLLAR  
BRASS HINGE  
Solid Lid  
No SOLDERING  
SAMPLE 15¢.  
**B. E. LEONARD, Scranton, Pa.**

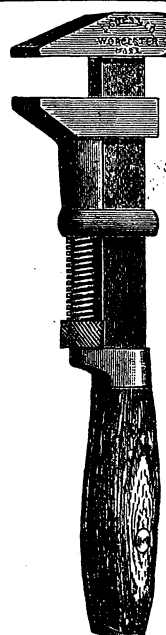
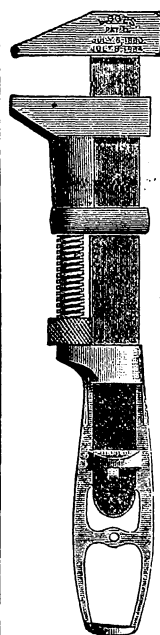
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FIVE DIFFERENT SIZED SPOUTS  
SEAMLESS BRASS COLLAR  
BRASS HINGE  
Solid Lid  
NO SOLDERING  
HINGE CANNOT MELT OFF.  
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Genuine Improved  
**KNIFE HANDLE**  
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**Screw Wrenches**

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Established in  
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Registered  
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Patented July  
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Patented July  
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Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

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**The BEST MADE and STRONGEST WRENCH in the MARKET**  
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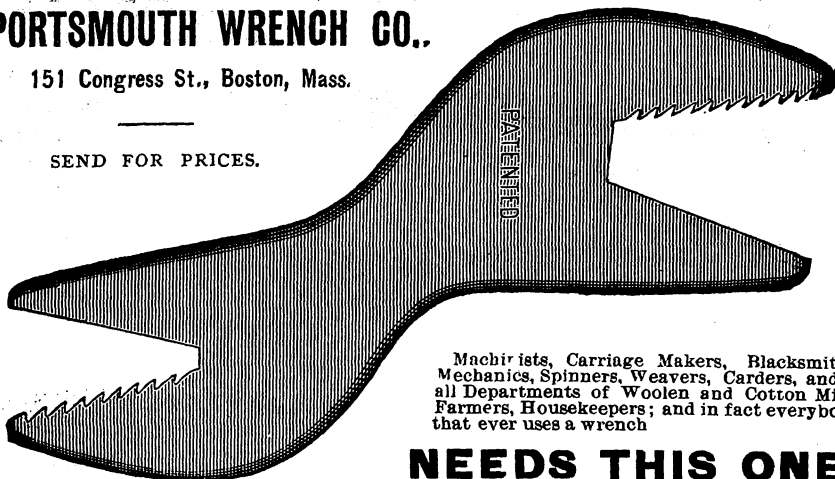
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FORGED STEEL, NICKEL PLATED.

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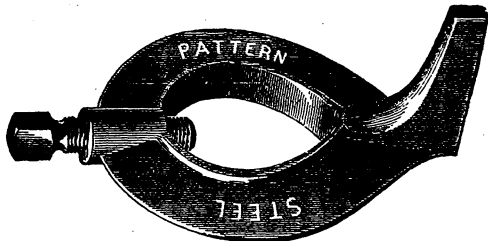


Machinists, Carriage Makers, Blacksmiths, Mechanics, Spinners, Weavers, Carders, and in all Departments of Woolen and Cotton Mills, Farmers, Housekeepers; and in fact everybody that ever uses a wrench

**NEEDS THIS ONE.**

## LE COUNT'S LIGHT STEEL DOG,

WITH STEEL SCREWS.



U. S. Standard.

Points Hardened.

No.	Inch.	Price.	No.	Inch.	Price.
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2.....	1/2.....	35	8.....	2.....	1 10
3.....	3/4.....	60	9.....	2 1/2.....	1 40
4.....	1.....	60	10.....	3.....	1 50
5.....	1 1/4.....	75	11.....	3 1/2.....	1 70
6.....	1 1/2.....	85	12.....	4.....	1 90

Small set of 8, \$5.50. Full set of 12, \$12.

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Fully Guaranteed.

The Best Possible Lawn  
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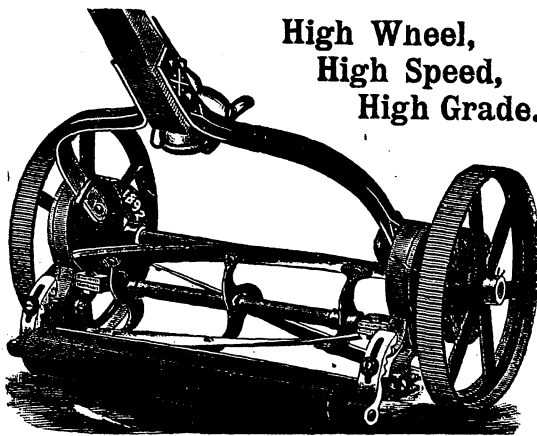
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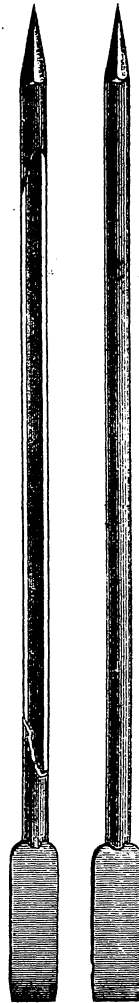
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*The lightest, strongest and  
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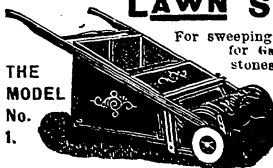
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WITH ATTACHMENTS.

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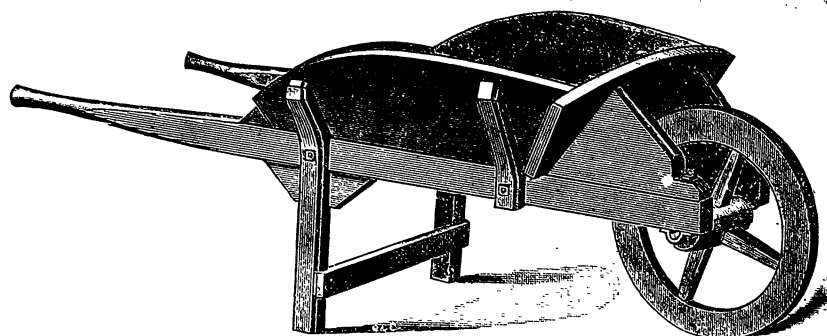
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For sweeping lawns after mowing, for gathering leaves, sticks, stones and litter. Used in Parks, Cemeteries, Tennis Courts and all public and private grounds. Two sizes.  
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MODEL  
No.  
1.

# Wheelbarrows, Stone Barrows AND Skids.

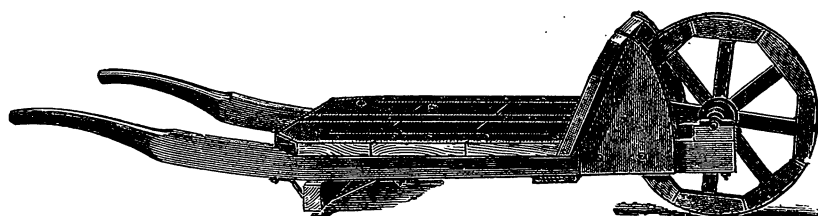


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Made according to specifications furnished by the U. S. Quartermaster's Department.

Legs and side braces held with  $\frac{3}{8}$ -in. iron rods that extend from handle to handle, making the barrow well bolted together. Wheel is heavily tired. A very good mining barrow and a handy barrow for handling bricks, broken stone, etc.

With Lansing Patent 18-in. Iron Hub Wheel, extra heavy.

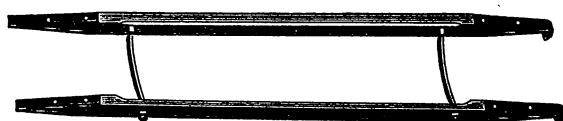


**BENT HANDLE STONE BARROW.**

Made for heavy work. Bottom and front of  $1\frac{1}{2}$ -in. hardwood, dressed and well seasoned. Barrows painted brown.

Size of bottom 28 in. wide, 27 in. long and 11 in. high in front. Size of handles  $1\frac{3}{4} \times 2\frac{3}{4}$  in. Handles made of oak, rock elm or hickory.

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Made of selected oak, rock elm or hickory. Ends heavily ironed. Oiled and varnished.

For prices of all styles of Barrows, Carts or Trucks write to

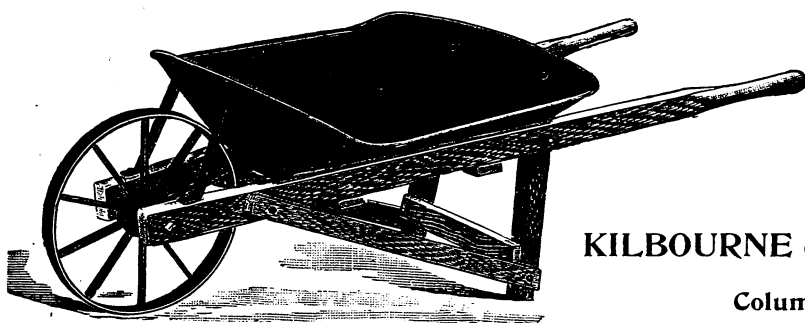
**LANSING WHEELBARROW CO.,**  
**LANSING, MICH.**



# More Satisfactory

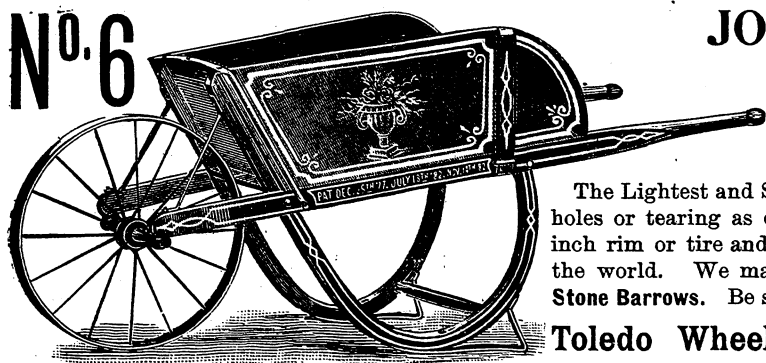
*relations between Dealer and Customer is the result of careful buying on the part of the former. The best products of manufacturers always commend themselves to such; hence the popularity of the Columbus Barrows and Scrapers.*

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The  
KILBOURNE & JACOBS MFG. CO.,  
Columbus, O., U. S. A.

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## JOINTLESS BENT LEG GARDEN BARROW.

The Lightest and Strongest. Legs will not mar the Lawn by punching holes or tearing as do the ordinary barrow. With its 20-inch wheel, 1½ inch rim or tire and chilled cap boxes, it is the easiest running barrow in the world. We make Railroad, Dump, Mortar, Sand, Coal, Wood, Tile and Stone Barrows. Be sure to write for catalogue "A."

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AUTOMATIC DUMP. IT HAS NO EQUAL.

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## AKRON TUBULAR STEEL WHEEL- BARROWS

ONE MAN CAN HAUL A TON. RE-ENFORCED TRAY. CORNERS DOUBLE THICKNESS.



## Boss Sprinkler.

For Potatoes, Tobacco, Cotton and all small Plants and Vines.

Has given satisfaction to all who have handled it.

Prices and Circulars sent on application.

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ALL STEEL

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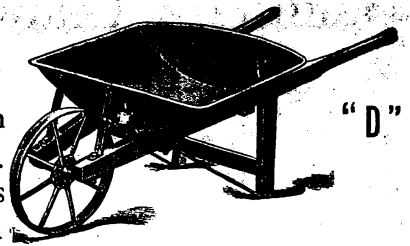
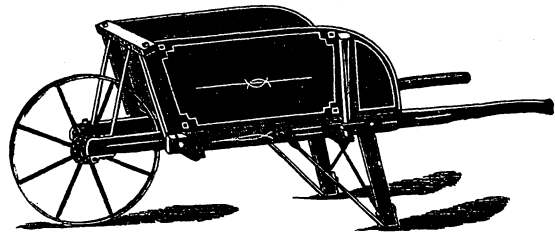
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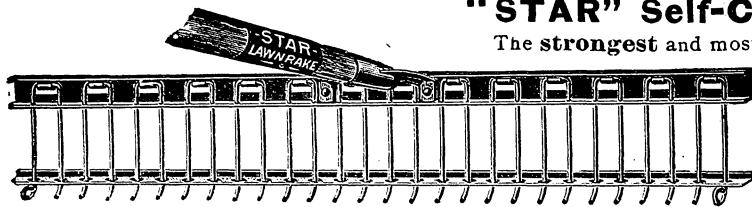
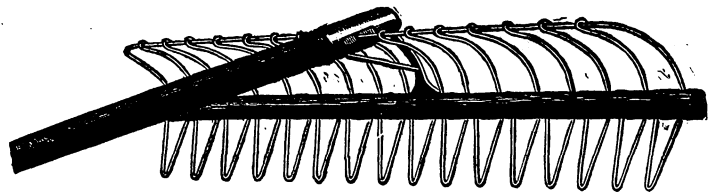


**Sidney Steel Scraper Co.,** 924 Poplar Street, SIDNEY, O.

## LAWN RAKES. The "GEM" AND "DAVIS."

Both good and each the best. If you have not stocked up, better do so at once. Our prices are low.

**SCHAEFFER & CO.,** Dayton, O.



"STAR" Self-Cleaning Lawn Rake.  
Pat. Feb. 21, 1893.

### "STAR" Self-Cleaning Lawn Rakes. All Steel.

The strongest and most practical rakes in the market. The cleaning bar keeps the teeth free from leaves and grass and the eyes on the end teeth prevent the other teeth from digging in the ground. We also make "STAR" Lawn Rakes as above without the self-cleaning bars and turned up end teeth.

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First-class high grade machines, made of the best materials. Neat, symmetrical, strong, durable and unexcelled in construction and ease of operation. Does perfect work. For prices address

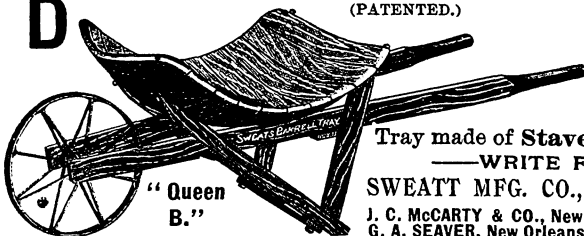


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GAFFNER & BAYLES, Eastern Agents, 91 Chambers St. & 73 Reade St., New York City.

## "BARREL TRAY" WHEELBARROWS.

(PATENTED.)

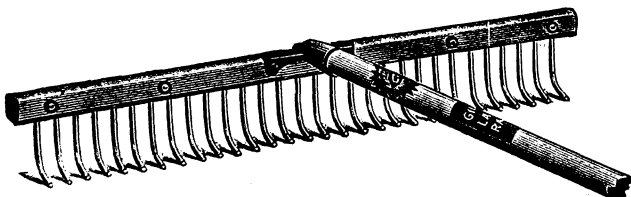


**BEST TRAY FRAME WHEEL.**

Tray made of Staves strung on Iron Rods.  
—WRITE FOR PRICES.—

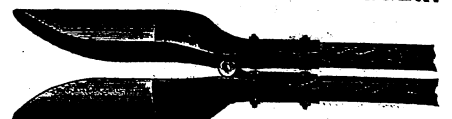
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J. C. McCARTY & CO., New York, Direct Representatives.  
G. A. SEAVER, New Orleans, Special Agent.

The most popular and cheapest Lawn Rake on the market is the "Canton."



Send for Prices and New Catalogue.

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When in the market for  
**LAWN RAKES and POST HOLE DIGGERS**

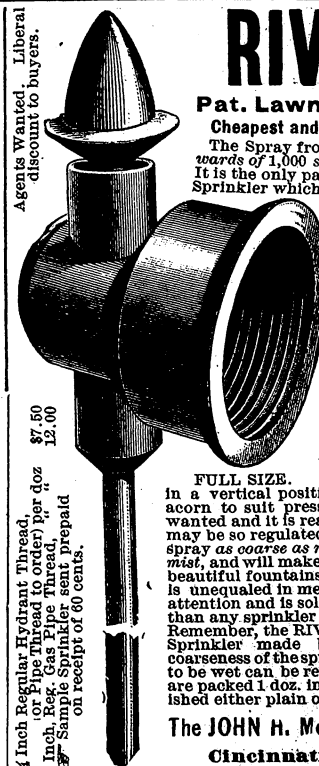
Remember our line is the largest, best and most complete made.

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Pat. Lawn Sprinkler  
Cheapest and Best in Use.

The Spray from it covers upwards of 1,000 sq. feet of lawn. It is the only patent adjustable Sprinkler which is adaptable to any water pressure. Being made of brass, and having no revolving parts to wear out, or small openings to clog up, it can be operated with sandy or muddy water as well as clear, and will last for years. To operate, screw Sprinkler on end of hose, stick thereto in to the ground.



**FULL SIZE.**  
In a vertical position, adjust the acorn to suit pressure and spray wanted and it is ready for use. It may be so regulated as to throw a spray as coarse as rain or as fine as mist, and will make one of the most beautiful fountains imaginable. It is unequaled in merit, requires no attention and is sold at a less price than any sprinkler in the market. Remember, the RIVAL is the only Sprinkler made by which the coarseness of the spray and the area to be wet can be regulated. They are packed 1 doz. in a box, and finished either plain or nickel plated.

**The JOHN H. MCGOWAN CO.**  
Cincinnati, Ohio.

Agents Wanted. Liberal discount to buyers.  
1/4 Inch Regular Hydrant Thread, \$7.50  
1 Inch Regular Hydrant Thread, \$12.50  
Sample Sprinkler sent prepaid on receipt of 50 cents.

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"The NEW MODEL,"

"NEW MODEL" HIGH WHEEL,

The "O. K.,"

The "RIVAL,"

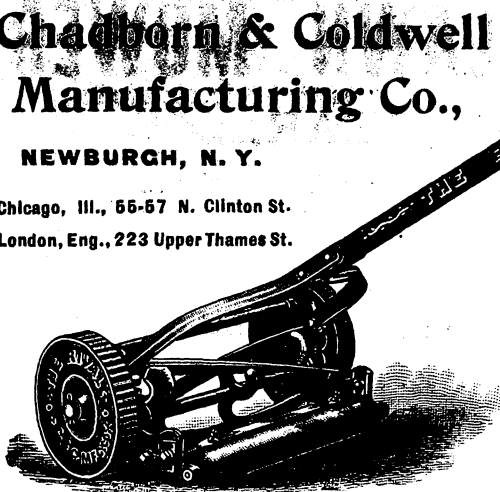
"EXCELSIOR"

ROLLER

and "EXCELSIOR"

HORSE

Lawn  
Mowers.



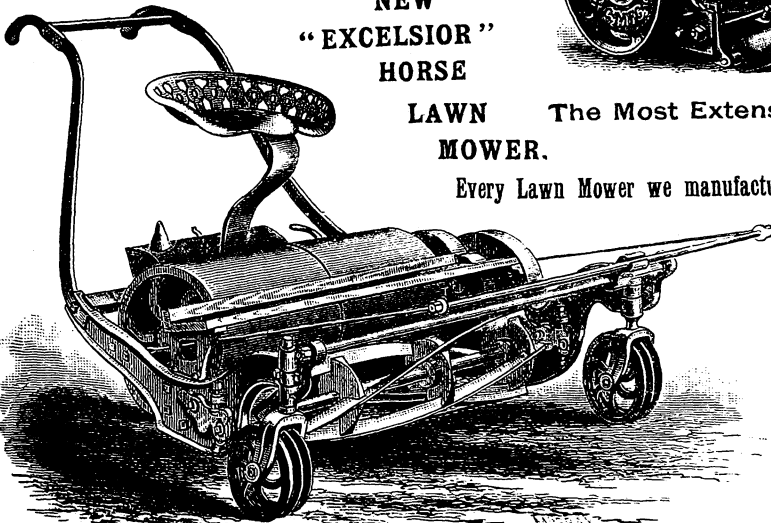
NEW  
"EXCELSIOR"  
HORSE

LAWN  
MOWER.

The Most Extensive Manufacturers of LAWN MOWERS  
in America.

Every Lawn Mower we manufacture is FULLY WARRANTED.

It will pay you to send to us for  
descriptive catalogue and trade dis-  
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for Lawn Mowers for the coming  
season.



## GENUINE PHILADELPHIA LAWN MOWERS.

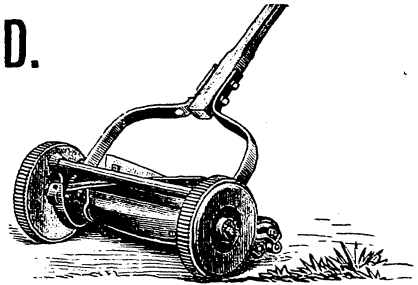
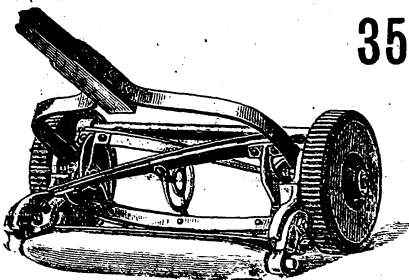
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Hand Sizes 10 to 20 inch.

Pony and Horse 30 and 36 inch.

Lawn Sweepers and  
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Send for Price-List and Discounts.



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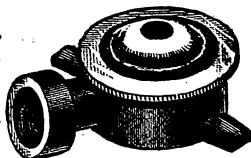


Japanese No. 12, Adjust

## LAWN SPRINKLERS

We manufacture the BEST and  
CHEAPEST Lawn Sprinklers in  
the World.

Cactus No. 9.

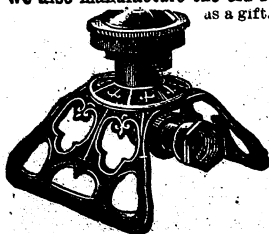


The only Sprinklers which have no revolving parts to leak or wear out.  
The only Sprinklers free from small holes, and which cannot become clogged with gritty sub-  
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The only Sprinklers which are adjustable and will give a spray as fine as the mist of Niagara, or  
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The best Sprinklers for high pressures, and the only sprinklers which will give satisfaction with  
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We also manufacture the old style revolving sprinklers, but for our own use would not have them  
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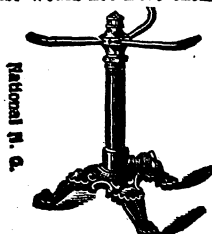


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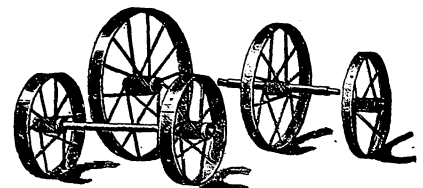
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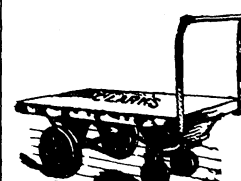
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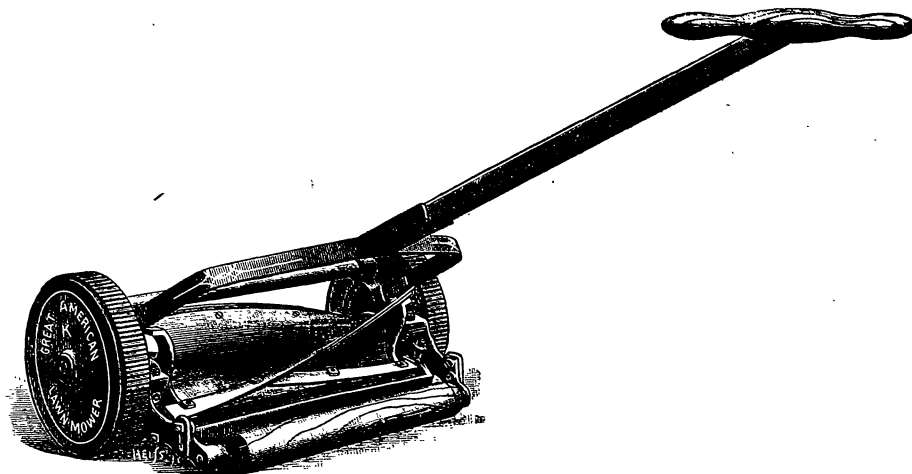
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## REAR CUT. INCASED GEAR.

Patent Cylinder Knives and Enos' Patent Yielding Bed Knife, making it the most durable Mower of this pattern on the market.

**CLOSED WIPER.**



Made in 5 Sizes, 10, 12, 14, 16 and 18 Inches.

Also manufacturers of Pennsylvania, Continental, New Quaker City, Rapid Transit and New Departure Lawn Mowers, Horse and Pony Mowers and Grass Catchers.

There is no question for doubt that the manufacturers of these Mowers manufacture double the quantity of Lawn Mowers of any other manufacturer in the known world, and have not made their reputation from price alone, but from the quality of Mowers turned out.

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 MANUFACTURERS OF  
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 Write for Circulars and Prices. **LAWN MOWERS OF HIGHEST GRADE**  
 FOR HAND AND HORSE-POWER.

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 Manufacturers of the best Wood and Iron Beam Steel, or Carbon, Right or Left Hand Plows in market. Also Standard Solid Steel Shovels, Coal Shovels, Coal and Grain Scoops and Spades, and the new patent Steel Snow Shovels. Furnace, Coal and Ash Scoops, Ice Choppers and Lawn Trimmers, Lawn Weeder, Garden Trowels, &c., &c. Send for prices.

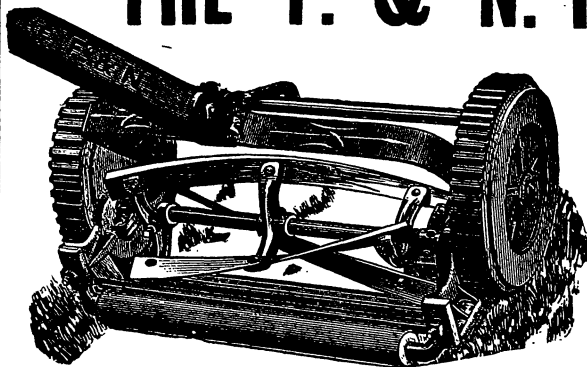


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**NEW CONCRETE MIXING MACHINES.**

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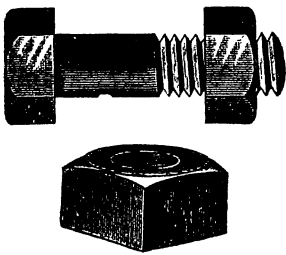
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Every Washer.  
**FLAT**  
With hole in  
**TRUE CENTER.**



Packed in kegs for general trade, or in 1 and 5 lb. boxes for hardware trade.

## MACHINE BOLTS.

## HOT PRESSED NUTS.

Highest  
Standard of  
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It will pay you to correspond with us.

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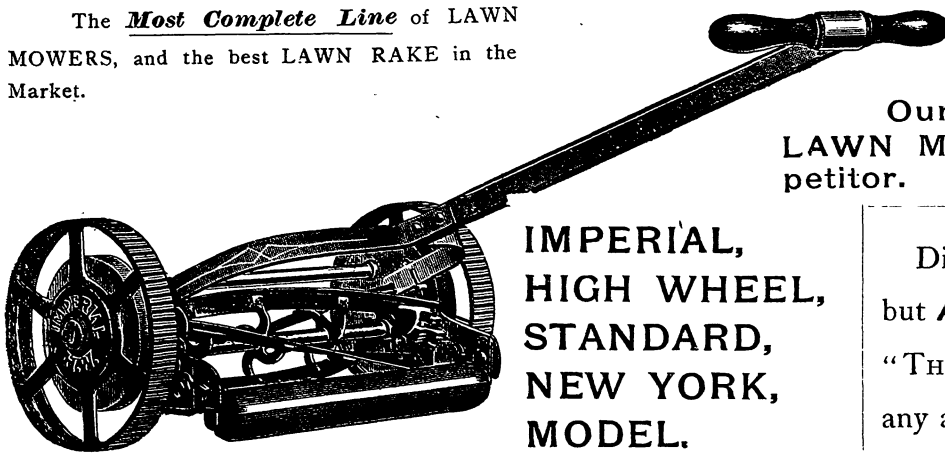
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All Standard Sizes, Regular or Odd, to Order.  
In Kegs or Packages, convenient for JOBBERS.

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MOWERS, and the best LAWN RAKE in the  
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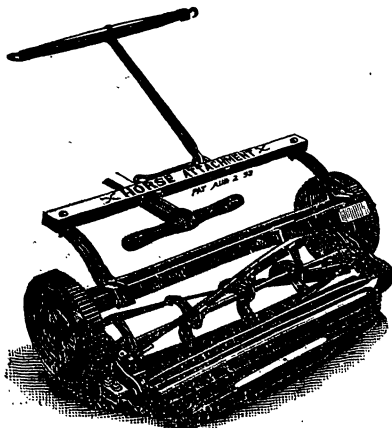
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LAWN MOWER Has no Com-  
petitor.

IMPERIAL,  
HIGH WHEEL,  
STANDARD,  
NEW YORK,  
MODEL.

Different Styles and Prices,  
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With Horse Attachment.



TEN INCH TRACTION WHEEL. EXCELS FOR FINE QUALITY OF MATERIAL AND  
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THE ONLY FIRST-CLASS COMBINATION MOWER ON THE MARKET. PRICES LOW,  
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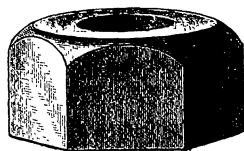
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## LAG SCREWS

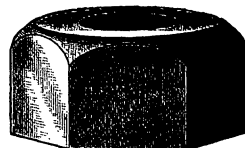
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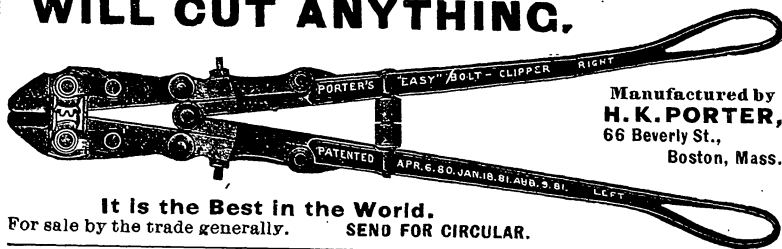
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NUTS FOR RAILROADS, CAR BUILDERS', LOCOMOTIVE BUILDERS' AND MARINISTS'  
USE A SPECIALTY.

CORRESPONDENCE SOLICITED.

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BOLTS, NUTS, WASHERS, RIVETS,Including Machine Bolts, Carriage Bolts, Bridge Bolts and Car Bolts,  
THE HARVEY PATENT GRIP-THREAD TRACK BOLT, Soft Steel Bolts with Cold Rolled  
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BOILER, BRIDGE AND SHIP RIVETS, Square and Hexagon Nuts of all kinds and sizes, Plate  
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Branch Establishment, THE KANSAS CITY BOLT & NUT CO., Kansas City, Mo.THE "EASY" BOLT CLIPPER.  
WILL CUT ANYTHING.Manufactured by  
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66 Beverly St.,  
Boston, Mass.It is the Best in the World.  
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BIEDER ADJUSTABLE GRASS CATCHER.  
FITS ALL MOWERS.It is cheap, light (weight  $1\frac{1}{2}$  lbs.), and sells upon its merits.

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THE CLEVELAND  
NOVELTY CO.,  
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Manufacturers of

Cloth, Iron and Iron Bottom Grass  
Catchers.

## THE LAWN MOWER'S PARTNER.

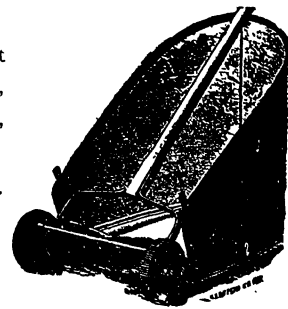
It is adjustable to all sizes and makes of Mowers.

We will guarantee satisfaction.

Also that it will outwear and carry more grass at  
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or those cheap canvas bags they call Grass Carriers,  
which are useless and dear at any price.See our exhibit at World's Fair Horticultural Hall.  
Send for explanatory circulars and new price-list.

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BOLTS OF ALL KINDS FOR RAILROADS, BRIDGE BUILDERS.

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**GIMLET POINT COACH SCREWS**

**Bolts, Cold-Punched Nuts and Washers, SUITABLE FOR MACHINERY OF ALL KINDS.**

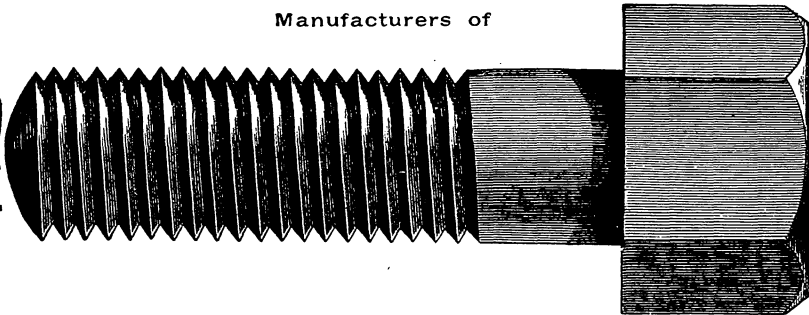
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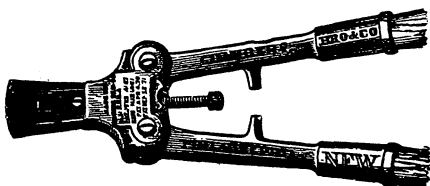


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### EXPANSION BOLTS.



For Fastening all Kinds of Structure to Brick and Stone Work.

Patentee and M<sup>r</sup>, **ISAAC CHURCH,**  
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For cutting off the ends of Bolts and Rivets.

Liberal discounts to the trade.

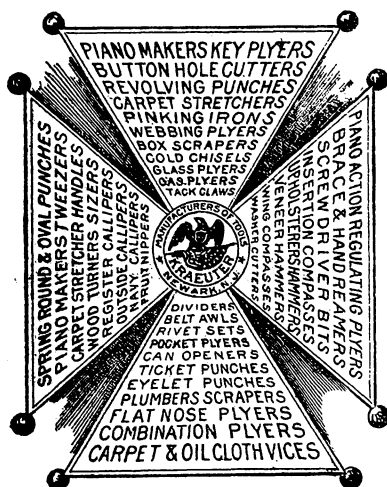
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**RIVETS**  
OF EVERY  
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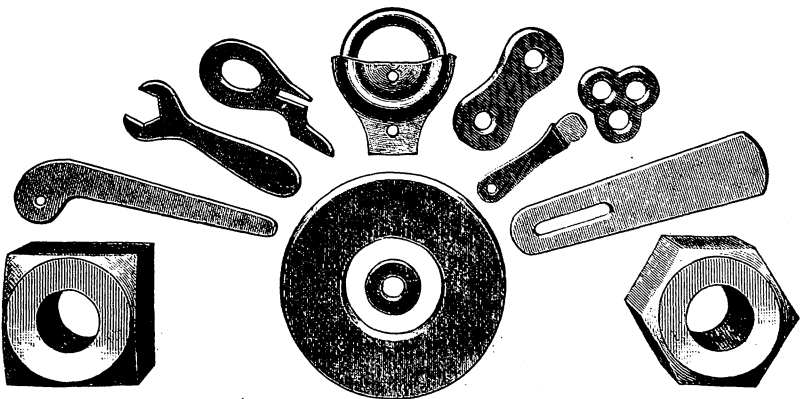
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Illustrations of various rivet types: ROUND HEAD, FLAT HEAD, STEEP HEAD, COUNTERSUNK HEAD, BELT RIVET, WAGON BOX HEAD, CONE HEAD, ROSE HEAD, TRUSS HEAD.

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Read, Wm. & Sons, Boston, Mass.  
Remington Arms Co., 313 Broadway, N. Y.  
Rouse-Durva Cycle Co., Peoria, Ill.  
Schoverling, Daly & Gales, 302 Broadway, N. Y.  
Western Wheel Works, Chicago, Ill.
- Bits and Braces.**  
Am. Bit Brace & Tool Co., Buffalo, N. Y.  
Bridgeport Run Implement Co., 313 & 315 Broadway, N. Y.  
Fray, Jno. S. & Co., Bridgeport, Conn.  
Graham Jno. H. & Co., 113 Chambers St., N. Y.  
Jennings, C. E. & Co., 97 Chambers, N. Y.
- Bits, Tackles, Makers of.**  
Boston & Lockport Block Co., Boston, Mass.  
and Lockport, N. Y.  
Cleveland Block Co., Cleveland, O.
- Fulton Iron & Engine Works, Detroit, Mich.**  
Shubert & Cottingham, Philadelphia, Pa.  
Toledo Block Works Toledo, O.
- Blowers.**  
Balfour Forge Co., Buffalo, N. Y.  
Champion Blower & Forge Co., Lancaster, Pa.  
Huyett & Smith Mfg. Co., Detroit, Mich.  
Survivant, B. F. & Co., Boston, Mass.
- Bolt Makers' Rolls.**  
New Doty Mfg. Co., Janesville, Wis.
- Bolt Plates.**  
Carbon Steel Co., Pittsburgh, Pa.  
McIlvain, Wm. & Sons, Reading, Pa.  
Lukens Iron & Steel Co., Coatsville, O.  
Pottstown Iron Co., Pottstown, Pa.
- Boilers, Copper.**  
Randolph & Clowes, Waterbury, Conn.
- Boilers, Steam.**  
Babcock & Wilcox Co., 30 Cortlandt, Edge Moor Iron Co., Wilmington.  
Harrison Safety Boiler Wks., Phila., Pa.  
Phoenix Iron Works Co., Meadville, Pa.  
Pollock, W. B. & Co., Youngstown, O.  
Southward Fdy. & Mch. Co., Phila., Pa.  
Wetherill, Robt. & Co., Chester, Pa.
- Bolt Cutters.**  
Chambers Bros. Co., Philadelphia.  
Howard Iron Works, Buffalo, N. Y.  
Porter, H. K., Boston, Mass.  
Wells Bros. Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Books.**  
Laird & Lee, Chicago, Ill.  
Lamberson, B., Portland, Ore.  
Marine Review, Cleveland, Ohio.  
Williams, David, 90-102 Reade, N. Y.  
Wolcott & West, Syracuse, N. Y.
- Boring Machines.**  
Buckeye Mfg. Co., Union City, Ind.
- Box Bander.**  
Goodell, J. W., Burlington, Vt.
- Boxes, Adv. Shell, &c.**  
Estes, E. B. & Sons, 254 Pearl St., N. Y.  
Green, A. H., 22 Park Place, N. Y.  
Jones, Jesse & Co., Philadelphia, Pa.
- Box Straps and Corners.**  
Buffalo Specialty Mfg. Co., Buffalo, N. Y.  
Cary Mfg. Co., 7-9 Elm St., N. Y.
- Brake Shoes.**  
Sargent Co., Chicago, Ill.
- Brass, Manufacturers of.**  
Ansonia Brass & Copper Co., N. Y.  
Davis John & Sons, 100 John, N. Y.  
Holmes, Booth & Hayden, N. Y.  
Plume & Atwood Mfg. Co., N. Y.  
Randolph & Clowes, Waterbury, Conn.  
Rome Brass and Copper Wks., Rome, N. Y.  
Scovill Mfg. Co., Waterbury, Conn.  
Vernon Brass Co., 296 B'way, N. Y.
- Brass Bells.**  
Tiebout, W. & J., 13 & 18 Chambers.
- Brass Foundries.**  
Best, Fox & Co., Pittsburgh, Pa.  
Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn.  
Crump, Wm. & Sons, S. & E. B. Co., Philadelphia, Pa.  
Emory, P. P. Mfg. Co., Springfield, Mass.
- Brass Goods.**  
Haight & Clark, Albany, N. Y.  
Keys, W. W. & R. M. Co., Bridgeport, Conn.  
North Bros. Mfg. Co., Phila., Pa.  
Reeves, Paul S., Philadelphia, Pa.  
Shaw, Luther & Son, Worcester, Mass.
- Bread Knives.**  
Christy Knife Co., Fremont, O.
- Bridge Builders.**  
Berlin Iron Bridge Co., East Berlin, Ct.  
Boston Bridge Works, Boston, Mass.  
Wrought Iron Bridge Co., Canton, O.
- Bronze (Tobin).**  
Ansonia Brass & Copper Co., 19-26 Cliff Street, N. Y.
- Brooms and Brushes.**  
Lay, Jos. & Co., Ridgewille, Ind.
- Builders' Hardware.**  
Dez, E. & 97 Chambers St., N. Y.  
Reading Hdw. Co., Reading, Pa.  
Russell & Erwin Mfg. Co., New York.  
Yale & Towne Mfg. Co., Stamford, Ct.
- Butcher and Shoe Knives, Manufacturers of.**  
Goodell Co., Antrim, N. H.  
Wason, John, Sheffield, England.
- Butter and Lard.**  
McKinney Mfg. Co., Alleghany, Pa.  
Sabin Machine Co., Montpelier, Vt.  
Stanley Works, New Britain, Conn.  
Tiebout, W. & J., 16 Chambers, N. Y.
- Cabinet Makers' Benches.**  
Grand Rapids Hand Screw Co., Grand Rapids, Mich.
- Calipers and Dividers.**  
J. Stevens Arms and Tool Co., Chicopee Falls, Mass.  
Starrett, L. S., Athol, Mass.
- Calif Weaners.**  
Carroll Muzzle Co., Carroll, Ia.
- Can Makers' Tools and Machines.**  
Niagara Stamping and Tool Co., Buffalo, N. Y.
- Car Axles.**  
Roberts, A. & P. & Co., Phila.
- Carboy Stands.**  
Hillebrand & Wolf, Philadelphia, Pa.
- Carriage Hardware, Makers of.**  
Cover's Saddlery Works, Farmer, N. Y.  
Eccles, Richard, Auburn, N. Y.  
Scranton Forging Co., Scranton, Pa.  
Smith, H. D. & Co., Plantsville, Conn.  
Wright & Howe Co., Birmingham, Conn.
- Cartridge Reloading Tools.**  
Ideal Mfg. Co., New Haven, Conn.
- Casters, Wheel, &c.**  
Clark, G. P., Windsor Locks, Conn.  
Gutwiler Mfg. Co., Hamilton, O.  
Tucker & Dorsey Mfg. Co., Indianapolis, Ind.
- Casings Iron and Steel.**  
Ames Sword Co., Chicopee, Mass.  
Arcade Malleable Iron Co., Worcester, Mass.  
Aschman Steel Casting Co., Thurlow, Pa.  
Booth, The Lloyd, Co., Youngstown, O.  
Burgess & Loxley, Buffalo, N. Y.
- The Burr & Houston Co., Brooklyn, N. Y.**  
Cambria Steel—Cambria Iron Co., Johnstown, Pa.  
Cheney & Son, Manlius, N. Y.  
Chester Steel Casting Co., Phila.  
Chrome Steel Works, Brooklyn, N. Y.  
Ette & Henger Mfg. Co., St. Louis, Mo.  
Eureka Cast Steel Co., Chester, Pa.  
Flagg, Stanley G. & Co., Phila.  
Haight & Clark, Albany, N. Y.  
Hammer & Co., Branford, Conn.  
Herriot, J. A., 284 Pearl St., N. Y.  
Johnson Foundry Co., Johnstown, Pa.  
Johnson, I. G. & Co., Spuyten Duyvil, Mahoning Fdy. & Mch. Co., Danville, Pa.  
New Castle Steel Casting Co., New Castle, Pa.  
Northwest Malleable Iron Co., Milwaukee, Wis.  
Palmer & De Mooy, Cleveland, O.  
Passato Art Casting Co., Passaic, N. J.  
Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.  
Sargent Co., Chicago, Ill.  
Sessions Foundry Co., Bristol, Conn.  
Shard Hdw. Co., Buffalo, N. Y.  
Shirley, H. K. & Howard Iron Co., St. Louis, Mo.  
Shilling Fdy. Co., Columbus, O.  
Spencer, I. S., Sons, Guilford, Conn.  
Standard Fdy. & Mfg. Co., Cleveland, O.  
Standard Steel Casting Co., Thurlow, Pa.  
Syracuse Steel Foundry, Syracuse, N. Y.  
Taylor & Boggis Fdy. Co., Cleveland, Ohio.  
Taylor Iron & Steel Co., High Bridge, N. J.  
Totten & Hogg Iron & Steel Fdy. Co., Pittsburgh, Pa.  
Trenton Mal. Iron Co., Trenton, N. J.  
Union Mfg. Co., 103 Chambers St., N. Y.  
West Cossackie Iron Fdy., Cossackie, N. Y.  
Wetherill, Robt. & Co., Chester, Pa.
- Chains.**  
Bradlee & Co., Philadelphia.  
Bridgeport Chain Co., Bridgeport, Conn.  
Link-Belt Engineering Co., Phila., Pa.  
McKay, Jas. & Co., Pittsburgh, Pa.
- Cherry Stoners.**  
Goodell Co., Antrim, N. H.
- Chimneys.**  
Phila. Engineering Works, Phila., Pa.
- Chisels, Manufacturers of.**  
Buck Bros., Millbury, Mass.  
White, L. & I. J. Co., Buffalo, N. Y.
- Chucks.**  
Cushman Chuck Co., Hartford, Conn.  
Hogson & Pettis Mfg. Co., New Haven, Conn.  
Horton, E. & Sons Co., Windsor Locks.
- Smith & Egge Mfg. Co., Bridgeport.**  
Skinner Chuck Co., New Britain, Conn.  
Union Mfg. Co., 103 Chambers, N. Y.  
Whitton, D. E. Mach. Co., New London, Conn.
- Churns.**  
Buckeye Churn Co., Sidney, O.  
Old Wagon Works, Ft. Wayne.  
Union Mfg. Co., Toledo, O.
- Clamps.**  
Hammer & Co., Branford, Conn.  
Le Count, C. W., So. Norwalk, Conn.
- Clippers.**  
Dez, Jesse & Sons, Philadelphia, Pa.
- Clipping Machines.**  
Hotchkiss, E. S., Bridgeport, Conn.  
McCoy, Jos. F. & Co., 26 Warren St.
- Clock Springs, Manufacturers of.**  
Haley Mfg. Co., Concord, N. H.
- Coal.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Wister, Francis, Philadelphia, Pa.
- Coffee and Spice Mills.**  
Sun Mfg. Co., Greenfield, O.
- Combs.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Houston, C. B. & Co., Philadelphia, Pa.  
Kelley, W. J., Cleveland, O.  
Sibell, Geo. H. & Co., Chicago, Ill.  
Wister, Francis, Philadelphia, Pa.
- Collectors.**  
Hardware Board of Trade (Limited) 4 and 6 Warren, N. Y.
- Condensers.**  
Worthington, Henry R., 86 & 88 Liberty Street, N. Y.
- Conveying Machinery.**  
Brown, Gladding & Conveying Machine Co., Cleveland, Ohio.  
Jeffrey Mfg. Co., Columbus, O.  
Link Belt Engineering Co., Phila., Pa.
- Copper.**  
Ames Sword Co., Chicopee, Mass.  
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.  
Hendricks Bros., 49 Cliff, N. Y.  
New Haven Copper Co., 284 Pearl, N. Y.  
Randolph & Clowes, Waterbury, Conn.  
Rome Brass and Copper Works, Rome, N. Y.  
Wister, Francis, Philadelphia, Pa.
- Coppersmiths.**  
Emory, P. P. Mfg. Co., Springfield, Mass.
- Cordage.**  
Elizabethport Cordage Co., 46 South, Samson Cordage Works, Boston, Mass.  
Travers Bros. Co., 107 Duane St., N. Y.
- Cork Screws.**  
Detroit Cork Screw Co., Detroit, Mich.  
Williamson, C. T. Wire Novelty Co., N. Y.
- Corn Huskers.**  
Perkins, H. H. Mfg. Co., Kewanee, Ill.
- Corn Poppers.**  
Olson, A. B., Kansas City, Mo.
- Corn Snellers.**  
Garry Iron Mfg. Co., Cleveland, O.
- Cornstubs and Fences.**  
Continental Iron Wks., Brooklyn, N. Y.
- Corrugated Iron.**  
Cambridge Roofing Co., Cambridge, O.  
Moseley Iron Bridge & Roof Co., 5 Dey, N. Y.
- Counting Machines.**  
Osborn, G. Edw. & Co., New Haven, Ct.
- Covers.**  
Almond, T. R., Brooklyn, N. Y.
- Coverings, Boiler and Pipe.**  
Johns, H. W. Mfg. Co., 87 Maiden Lane.
- Cranes.**  
Allentown Rolling Mills, Allentown, Pa.  
Detroit Foundry Equipment Co., Detroit, Mich.  
Maris & Beckley Philadelphia, Pa.
- Ridgway, Craig & Sons, Coatesville, P.**  
Sellers, Wm. & Co., Inc., Phila., Pa.  
Yale & Towne Mfg. Co., Stamford, Conn.
- Cupolas, Hot-Blast.**  
Colliau, Victor, Detroit, Mich.  
Detroit Fdy. Equipment Co., Detroit, Mich.
- Curry Combs.**  
Kohler, F. E. & Co., Canton, O.  
Noyes, E. B. & Co., Greenfield, Mass.  
Spring Curry Comb Co., So. Bend, Ind.
- Outlery Cases.**  
Torrey, J. A. & Co., Worcester, Mass.
- Outlery, Importers of.**  
Gurney, Fred B., 116 Chambers St., N. Y.  
Sickles, Sweet & Lyon, 35 Barclay, N. Y.
- Outlery, Manufacturers of.**  
Chapin Outlery Co., Toledo, Ohio.  
Christy Knife Co., Fremont, O.  
Curley, J. & Bro., 6 Warren St., N. Y.  
Dane, Stoddard & Kendall, Boston, Mass.  
Goddell, Outlery Co., 113 Chambers, N. Y.  
Goddell Co., Antrim, N. H.  
Landers, Frary & Clark, New Brit's, Conn.  
Northampton Outlery Co., Northampton, Mass.  
Wilson, John, Sheffield, England.
- Cutting-off Tools.**  
A. N. Vending Mch. Co., 29 Murray, N. Y.
- Designer, Metal Work.**  
Arnold, F. H., New Britain, Conn.
- Dies.**  
Dillon, J. Fred, Worcester, Mass.
- Drill Machines.**  
Home Novelty Mfg. Co., St. Louis, Mo.
- Dog Collars.**  
Chapman Mfg. Co., Meriden, Conn.  
Kelley & Woolworth, Niagara Falls, N. Y.
- Union Hardware Co., Torrington, Ct.**  
Doe, Extremators.  
Botts, U. C. & Co., Toledo, Ohio.
- Door Checks.**  
Utility Door Check Co., Chicago, Ill.
- Door Knobs.**  
Bardsley, J., 149 & 151 Baxter St., N. Y.
- Drain Cleaners.**  
Buckeye Mfg. Co., Union City, Ind.
- Drilling Machines.**  
Bickford Drill Tool Co., Cin., Ohio.  
Brady Mfg. Co., Brooklyn, N. Y.  
Buffalo Forge Co., Buffalo, N. Y.  
Burnham, Geo. Co., Worcester, Mass.  
Champion Blower and Forge Co., Lancaster, Pa.  
Colburn, A. L., New Haven, Conn.  
Dallett, Thos. H. & Co., Philadelphia.  
Dwight Lathe Machine Co., Hartford, Conn.  
Halsey, Jas. T., Philadelphia, Pa.  
Herriot & Cowell, New Haven, Conn.  
Illinois Iron and Bolt Co., Carpentersville, Ill.  
Norton & Jones Machine Tool Works, Plainville, Conn.  
Quint, A. D., Hartford, Conn.  
Sellers, Wm. & Co., Inc., Phila., Pa.  
Sibley & Ware, So. Bend, Ind.  
Sigourney Tool Co., Hartford, Conn.  
Silver Mfg. Co., Salem, O.  
Smith Friction Drill & Tool Co., Boston, Mass.  
Woodward & Rogers, Hartford, Conn.
- Drop Forgings.**  
Belden Mach. Co., New Haven, Conn.  
Billings & Spencer Co., Hartford, Conn.  
Boothe, W. C. Mfg. Co., Boonton, N. J.  
Eccles, Richard, Auburn, N. Y.  
Herbrand Co., N. Y.  
Merrill Bros., 28 First, Brooklyn, E. D.  
Miner & Peck Mfg. Co., New Haven, Ct.  
Phila. Drop Forge Co., Philadelphia, Pa.  
Scranton Forging Co., Scranton, Pa.  
Spiera, J. C. & Co., Worcester, Mass.  
Williams, J. H. & Co., Brooklyn, N. Y.  
Willms & Hobbs Mfg. Co., Bridgeport, Conn.
- Drop Presses.**  
Bliss, E. W. & Co., Brooklyn, N. Y.  
Crosby, G. A. & Co., Chicago, Ill.  
Eaton, Geo. H. & Co., Boston, Mass.  
Farroutte Mch. Co., Bridgeport, N. J.  
Miner & Peck Mfg. Co., New Haven, Conn.  
Stiles & Parker Press Co., Brooklyn, N. Y.  
Vulcan Iron Works, Chicago, Ill.  
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.
- Dunnage Meters.**  
Storm Mfg. Co., Newark, N. J.
- Dynamite.**  
New York Powder Co., 62 Liberty St., N. Y.
- Dynamics.**  
C. & C. Electric Motor Co., 402 and 404 Greenwich St., N. Y.  
Lowell Mfg. Co., Ltd., Erie, Pa.  
Zucker & Levitt Chemical Co., 10 and 14 Grand St., N. Y.
- Edge Tools, Makers of.**  
Amer. Axe & Tool Co., 280 B'way, N. Y.  
Buck Bros., Millbury, Mass.  
Butcher, W. & S., 135 Duane St., N. Y.  
Buffalo Edge Tool Wks., Buffalo, N. Y.  
Plumb, Fayette R., Philadelphia, Pa.  
Standard Axe & Tool Co., Ridgway, Pa.  
Warren Axe & Tool Wks., Warren, Pa.  
White, L. & I. J. Co., Buffalo, N. Y.
- Egg Beaters.**  
North Bros. Mfg. Co., Philadelphia.
- Electric Bells and Supplies.**  
Ostrander, W. & Co., New York.  
Wollensak, J. E., Chicago, Ill.
- Electric Dynamo Machines.**  
Hanson & Van Winkle Co., Newark, N. J.
- Electric Elevators.**  
Smith Hill Co., Quincy, Ill.
- Electric Welding.**  
Thomson Electric Welding Co., Boston, Mass.
- Electro-Platers.**  
Boardman, L. & Son, East Haddam, Ct.  
Elevator Buckets.  
W. J. Clark & Co., Salem, Ohio.
- Elevator Gates.**  
Richmond Safety Gate Co., Richmond, Ind.
- Elevators, Makers of.**  
Link-Belt Engineering Co., Phila., Pa.  
Moline Elevator Co., Moline, Ill.  
Morse, Williams & Co., Phila., Pa.  
Salem Fdy. & Mch. Co., Salem, Mass.  
Variety Mch. Co., Warsaw, N. Y.  
Emery and Emery Wheels.  
Bell, Geo. E., 30 John St., N. Y.

**Grant Corundum Wheel Mfg. Co.**  
Chester, Mass.  
**Hampden Emery and Corundum Co.**  
Chester, Mass.  
**Michigan Emery Wheel Co., Detroit**  
Mich.  
**N. Y. Belting & Packing Co., Ltd., 2**  
New York  
**Norfolk Emery Wheel Co., Worcester**  
Mass.  
**Springfield Emery Wheel Mfg. Co.**  
Bridgeport, Conn.  
**Sterling Emery Wheel Co., 174 Fulton**  
St., New York  
**Waltham Emery Wheel Co., W.**  
tham, Mass.  
**Enamels.**  
**Nubian Iron Enamel Co., Cragin, Ill.**  
**Engineers and Contractors.**  
**Alken Henry, Pittsburgh, Pa.**  
**Artificial Gas Engineering Co., Pitts-**  
burgh, Pa.  
**Brady Mfg. Co., Brooklyn, N. Y.**  
**Carten, Henry J., Pittsburgh, Pa.**  
**Christie, W. Wallace, Paterson, N. J.**  
**Herlick, J. A., 284 Pearl St., N. Y.**  
**Kennedy, Julian, Pittsburgh, Pa.**  
**Langhlin, Alex. & Co., Pittsburgh, Pa.**  
**Leah, R. B., Pittsburgh, Pa.**  
**McClure, Amster & Co., Pittsburgh, Pa.**  
**Pittsburgh Iron & Steel Engineerin**  
g Co., Pittsburgh, Pa.  
**Roberts, Frank C., Philadelphia, Pa.**  
**Smythe, S. R. Co., Incorporated Pitts-**  
burgh, Pa.  
**Swindell, W. & Bros., Pittsburgh, Pa.**  
**Wilkie, Bothwell & Co., Ltd., Pitts-**  
burgh, Pa.  
**Witherow, Jas. P. Co., Pittsburgh, Pa.**  
**Engines, Gas.**  
**Otto Gas Engine Works, Phila., Pa.**  
**Rollason Gas Engine, Havemayer Bldg.**  
N. Y.  
**Engines, Steam, Makers of.**  
**Pass Foundry & Machine Works, Ft.**  
Wayne, Ind.  
**Buckeye Engine Co., Salem, O.**  
**Cleveland & Harwick, Erie, Pa.**  
**Lane & Bodley Co., Cincinnati, O.**  
**Leffel, W. C. Co., Springfield, O.**  
**Norwalk Iron Works Co., So. Norwalk,**  
Conn.  
**Phoenix Iron Wks. Co., Meadville, Pa.**  
**Shipman Engine Co., Boston, Mass.**  
**Southward Foundry and Machine Co.**  
Phila., Pa.  
**Tod, William & Co., Youngstown, O.**  
**Wetherill, Robt. & Co., Chester, Pa.**  
**Exhaust Tumblers.**  
**Sweater, W., Brockton, Mass.**  
**Expansion Bolts.**  
**Boone, W. C. & Son, Brooklyn, N. Y.**  
Church, Isaac, Toledo, O.  
**Faucets, Self-Measuring.**  
**Lane Bros., Poughkeepsie, N. Y.**  
**Faucets, Wooden, Makers of.**  
**Boston & Lockport Block Co., Boston**  
Mass., and Lockport, N. Y.  
**John Sommer's Son, Newark, N. J.**  
**Feed-Water Heaters.**  
**Davis, I. B. & Son, Hartford, Conn.**  
**Goubert Mfg. Co., 32 Cortlandt St., N. Y.**  
**Harrison Safety Boiler Wks. Phila., Pa.**  
**National Pipe Bending Co., New**  
Haven, Conn.  
**Webster, Warren & Co., Phila., Pa.**  
**Whitlock Coil Pipe Co., Elmwood,**  
Conn.  
**Fencing, Iron and Wire.**  
**Barum, E. T., Detroit, Mich.**  
**Champion Iron Co., Kenton, O.**  
**Clinton Wire Cloth Co., Clinton, Mass.**  
**DeKalt Fence Co., DeKalb, Ill.**  
**Gilbert & Bennett Mfg. Co., 42 Cliff St.,**  
Hartman Mfg. Co., Beaver Falls, Pa.  
**Kilmer Mfg. Co., Newburgh, N. Y.**  
**Mast, Foss & Co., Springfield, O.**  
**The Van Dorn Iron Works Co., Cleve-**  
land, O.  
**Reliance Wire Works Co., Milwaukee,**  
Fiber Ware.  
**Standard Fiber Ware Co., Mankato,**  
Minn.  
**Files, Importers of.**  
**Moss, E. W., 30 John, N. Y.**  
**Files and Chains, Manufacturers of.**  
**Banker & White, Troy, N. Y.**  
**Barnett, G. & E., 41 & 43 Richmond**  
Phila.  
**Butcher, W. & S., 135 Duane St., N. Y.**  
**McGaffrey File Co., Philadelphia.**  
**Nicholson File Co., Providence, R. I.**  
**Fire Brick, Makers of.**  
**Borgner, Cyrus, Philadelphia, Pa.**  
**Gardner, Jas. & Son, Cumberland, Md.**  
**Freischel & Sons, Foot E. Houston, St**  
McLeod & Henry Co., Troy, N. Y.  
**Maurer, H. & Son, 420 E. 23d, N. Y.**  
**Renovo Fire Brick and Clay Co., Phila.**  
**Ostrander Fire Brick Co., Troy, N. Y.**  
**Presbrey Stove Lining Co., Taunton,**  
Mass.  
**Valentine, M. D. & Bro., Woodbridge,**  
Fire Sets.  
**Troy Nickel Works, Troy, N. Y.**  
**Fishing Tackle.**  
**Dance, Stoddard & Kendall, Boston,**  
Mass.  
**Flint and Emery Paper.**  
**Beader, Adamson & Co., Phila., Pa.**  
**Flour Sifters.**  
**Meyers, F. J. Mfg. Co., Covington, Ky**  
Flue Cleaners.  
**Mackey, Jas. T. St. Louis, Mo.**  
**Fly Fans.**  
**Mathial, Ingram & Co., Baltimore, Md**  
**Fodder Cutters.**  
**Silver Mfg. Co., Salem, O.**  
**Forges, Portable, &c.**  
**Bradley & Co., Syracuse, N. Y.**  
**Buffalo Bellows Co., Cleveland, O.**  
**Buffalo Forge Co., Buffalo, N. Y.**  
**Champion Blower & Forge Co., Lan-**  
caster, Pa.  
**Empire Portable Forge Co., Lansing-**  
burg, N. Y.  
**Sturtevant, B. F. Co., Boston, Mass.**  
**Forgings, Iron and Steel.**  
**Bethlehem Iron Co., S. Bethlehem, Pa.**  
**Cambridge Steel-Cambridge Iron Co.,**  
Johnstown, Pa.  
**Scranton Forging Co., Scranton, Pa.**  
**Foundry Facilities.**  
**Chicago Fdy. Supply Co., Chicago, Ill.**  
**MacKellar Foundry Facing & Supply**  
Co., Quincy, Ill.  
**Paxson, J. W. & Co., Phila.**  
**S. Obermayer Co., Cincinnati, O.**  
**Smith, J. D. Fdy. Supply Co., Cinna., O.**  
**Whitehead Bros. Co., 517 W. 15th St.,**  
Foundry Riddles.  
**Ester, W. S., 65 Fulton, N. Y.**  
**Foundry Supplies.**  
**Chicago Fdy. Supply Co., Chicago, Ill**

**Collian, Victor, Detroit, Mich.**  
**MacKellar Fdy. Facing & Supply Co.,**  
Quincy, Ill.  
**S. Obermayer Co., Cincinnati, O.**  
**Paxson, J. W. & Co., Philadelphia.**  
**Smith, J. D. Fdy. Supply Co., Cinna., O.**  
**Whitehead Bros. Co., 517 W. 15th St**  
**Clutches.**  
**Keystone Clutch & Mch. Wks., Phila.**  
**Doors & White Co., Philadelphia, Pa.**  
**Frut Presses.**  
**Enterprise Mfg. Co., Philadelphia, Pa.**  
**Fuel Burners.**  
**Cass, W. S., 45 Drexel Bldg., N. Y.**  
**Furnaces, Gasoline.**  
**Burgess Soldering Furnace Co., Co-**  
lumbus, Ohio.  
**Garden Tools.**  
**Dunlap, C. W., Box 2703, New York.**  
**Noyes, B. B. & Co., greenfield, Mass.**  
**Gas Producers.**  
**Wood, R. D. & Co., Philadelphia, Pa.**  
**Gas & Steam Fitters' Supplies.**  
**Pancoat & Mauls, Phila., Pa.**  
**Gauge, Rolling Mill.**  
**Haines Gauge Co., Philadelphia, Pa.**  
**Gear Cutters.**  
**T. E. Whiton Mach. Co., New London,**  
Conn.  
**Gears.**  
**Boston Gear Works Boston Mass.**  
**Gleason Tool Co., Rochester, N. Y.**  
**New Process Raw Hide Co., Syracuse,**  
N. Y.  
**Poole, Robt. & Son Co., Baltimore,**  
Md.  
**Union Fdy. & Mch. Co., Pittsburgh, Pa.**  
**Glass Tubes.**  
**Aschroft Mfg. Co., 111 Liberty St., N. Y.**  
**Glass Cutters.**  
**Moss, S. G., Bristol, Conn.**  
**Glue.**  
**Beader, Adamson & Co., Phila., Pa.**  
**Improved Process Glue Co., Gloucester**  
Mass.  
**Leggett & Bros., 301 Pearl St., N. Y.**  
**Issis Cement Co., Gloucester, Mass.**  
**Grass Catchers.**  
**Cleveland Novelty Co., Cleveland, O.**  
**Glennon & Krause, Chicago, Ill.**  
**Thompson Mfg. Co., Elkhart, Ind.**  
**Grinding and Polishing Ma-**  
chines.  
**Diamond Mch. Co., Providence, R. I.**  
**Herrick & Cowell, New Haven, Conn.**  
**Norton Emery Wheel Co., Worcester,**  
Mass.  
**Washburn Shops, Worcester, Mass.**  
**Grindstone Dressing Machinery.**  
**Blake & Johnson, Waterbury, Conn.**  
**Grindstones.**  
**Cleveland Stone Co., Cleveland, O.**  
**Horn Grindstone Co., Port Austin,**  
Mich.  
**Gun Implements.**  
**Iron Hdw. Co., Torrington, Conn.**  
**Gunpowder, Makers of.**  
**Lafin & Rand Powder Co., N. Y.**  
**Hand Carts.**  
**Landing Wheelbarrow Co., Lansing,**  
Mich.  
**Hand Screws.**  
**Grand Rapids Hand Screw Co., Grand**  
Rapids, Mich.  
**Haier Chains.**  
**Kelle & Woodworth, Niagara Falls,**  
N. Y.  
**Handles.**  
**Ester, E. B. & Sons, 254 Pearl St., N. Y.**  
**Hartwell, E. S., Gallipolis, Ohio.**  
**New Process Raw Hide Co., Syracuse**  
N. Y.  
**New York Mallet and Handle Wks.**  
456 E. Houston St., N. Y.  
**Hangers, Door.**  
**Crocket, George, Elmira, N. Y.**  
**Lane Bros., Poughkeepsie, N. Y.**  
**Victor Mfg. Co., Newburyport, Mass.**  
**Hardware Comm'n Merchants.**  
**Doscher, Martin, 88 Chambers, N. Y.**  
**Graham, John H. & Co., 111 Chambers**  
St., New York.  
**Jacobus, W. & Co., 90 Chambers, N. Y.**  
**Hardware Manufacturers.**  
**Dunlap, C. W., Box 2703, New York.**  
**Hochkiss, E. S., Bridgeport, Conn.**  
**Stearns, E. C. & Co., Syracuse, N. Y.**  
**Union Mfg. Co., 108 Chambers, N. Y.**  
**Yale & Towne Mfg. Co., Stamford,**  
Conn.  
**Hardware Mfrs. Agents.**  
**Bingham, W. Co., Cleveland, O.**  
**Graham, John H. & Co., 111 Chambers,**  
Hussey, E. J. & Co., 80 John St., N. Y.  
**McCoy, Jos. F. & Co., 26 Warren St., N. Y.**  
**Sickles, Sweet & Lyon, 36 Barclay, N. Y.**  
**Underhill, Clinch & Co., 94 Chambers**  
St., N. Y.  
**Hardware Specialties.**  
**Ame Shear Co., Bridgeport, Conn.**  
**Belden Machine Co., New Haven, Conn.**  
**Clark Mfg. Co., Buffalo, N. Y.**  
**Ellis, Geo. D. & Sons Co., Philadelphia**  
Pa.  
**Empire Portable Forge Co., Lansing-**  
burg, N. Y.  
**Enterprise Mfg. Co., Philadelphia, Pa.**  
**Ette & Henger Mfg. Co., St. Louis, Mo.**  
**Gwinner Mfg. Co., Hamilton, O.**  
**Hart, H. C. Mfg. Co., Detroit, Mich.**  
**Henn, A. S. & Co., New Haven, Conn.**  
**Home Novelty Mfg. Co., St. Louis.**  
**Knapp & Cowles Mfg. Co., Bridgeport,**  
Conn.  
**North Bros. Mfg. Co., Philadelphia, Pa.**  
**Shepard, Sidney & Co., Buffalo, N. Y.**  
**Welland, Chas., 118 Chambers St., N. Y.**  
**Wilson, J. Fred, Worcester, Mass.**  
**Wise Goods Co., Worcester, Mass.**  
**York, H. Clinch & Co., 94 Chambers**  
Street, N. Y.  
**Hardware, Yacht and Ship.**  
**Ferdinand, L. W. & Co., Boston, Mass.**  
**Harness Snaps.**  
**Covert Mfg. Co., West Troy, N. Y.**  
**Coverts' Saddlery Wks., Farmer, N. Y.**  
**Fitch, W. & E. T., New Haven, Conn.**  
**Hair Nives.**  
**Holt, Hiram, Co., E. Wilton, Mass.**  
**Hoisting Machines.**  
**Jox, Alfred & Co., 314 Green, Phila.**  
**Jrow, Hoisting & Conveying Mch. Co.,**  
Cleveland, Ohio.  
**Copeland & Bacon, 85 Liberty St., N. Y.**  
**Iron Iron & Engine Wks., Detroit,**  
Mich.  
**Harrington, E. Son & Co., Phila.**  
**Lane Bros., Poughkeepsie, N. Y.**  
**Lidgerwood Mfg. Co., 96 Liberty, N. Y.**  
**Maris & Beekley, Philadelphia.**  
**Moore Mfg. & Fdy. Co., Milwaukee, Wis**

**Hollow-Ware.**  
**Bronson Supply Co., Cleveland, Ohio.**  
**Morse, Williams & Co., Phila.**  
**Sellers, Wm. & Co., Phila. and N. Y.**  
**Spindel, J. G., Reading, Pa.**  
**Yale & Towne Mfg. Co., Stamford, Ct.**  
**Cleveland Stamping & Tool Co., Cleve-**  
land, O.  
**Stuart & Peterson Co., Phila., Pa.**  
**Horse and Barbers' Clippers.**  
**Hochkiss, E. S., Bridgeport, Conn.**  
**Horse Nails, Makers of.**  
**National Horse Nail Co., Vergennes, Vt.**  
**Horse Shoes, Makers of.**  
**Bryden Horse Shoe Co., Catsauqua,**  
Pa.  
**Burden Iron Co., Troy, N. Y.**  
**Diamond State Iron Co., Wilmington,**  
Del.  
**Old Dominion Iron & Nail Works Co.,**  
Richmond, Va.  
**Phoenix Horse Shoe Co., Poughkeep-**  
sie, N. Y.  
**Rhode Island Perkins Horse Shoe Co.,**  
Providence.  
**Standard Horse Shoe Co., Boston,**  
Mass.  
**The Burden Iron Co., Troy, N. Y.**  
**Rose.**  
**Cleveland Rubber Co., Cleveland, O.**  
**N. Y. Belting & Packing Co., Ltd., 15**  
Park Row, N. Y.  
**Hose Menders.**  
**Hudson, C. E. & Co., Leominster,**  
Mass.  
**Hydrants, &c.**  
**McLean, John, 296 & 298 Monroe, N. Y.**  
**Hydraulic Jacks.**  
**Dudgeon, Richard, 24 Columbia, N. Y.**  
**Wilson & Stillman, 204 E. 43d, N. Y.**  
**Ice Breakers.**  
**Wharton, J. S. L., Philadelphia, Pa.**  
**Ice-Cream Freezers.**  
**North Bros. Mfg. Co., Phila., Pa.**  
**Packer, C. W., Philadelphia, Pa.**  
**Shepard Hdwn. Co., Buffalo, N. Y.**  
**White Mountain Freezer Co., Nashua,**  
N. H.  
**Ice Shavers.**  
**Enterprise Mfg. Co., Philadelphia, Pa.**  
**Injectors.**  
**Jenkins Bros., New York**  
**Sherwood Mfg. Co., Buffalo, N. Y.**  
**Insurance, Boiler.**  
**Hartford Steam Boiler Inspection &**  
Insurance Co., Hartford, Conn.  
**Iron and Steel, Sweden.**  
**Lundberg, Gustaf, Boston, Mass.**  
**Mine, A. & Co., 1 Broadway, N. Y.**  
**Iron Commission Dealers.**  
**Corning, Edw. & Co., 29 B'way, N. Y.**  
**Cotton, Bradley & Co., Philadelphia.**  
**Etting, Edw. J., Philadelphia.**  
**Hogan, John L. & Co., Philadelphia, Pa.**  
**Hoffman, J. W. & Co., Philadelphia.**  
**Leah, J. & Co., Philadelphia.**  
**Leah, J. & Co., Philadelphia.**  
**Mohr, J. J., 480 Walnut, Philadelphia.**  
**Mann, E. R. & Co., Philadelphia.**  
**Pilling & Crane, Philadelphia, Pa.**  
**Sibell, Geo. H. & Co., Chicago, Ill.**  
**Wilhelm & Co., Harrisburg, Pa.**  
**Wilson, L. & R. Co., Phila., Pa.**  
**Iron Ore.**  
**Naylor & Co., 45 Wall, N. Y.**  
**Pickands, Brown & Co., Chicago, Ill.**  
**Pullman, J. Wesley, Phila., Pa.**  
**Samuel, Frank, Philadelphia, Pa.**  
**Iron, Merchants.**  
**Borden & Lott, 70 West, N. Y.**  
**Bussentut & Cuniffie, Philadelphia.**  
**Corning Edw. & Co., 29 B'way, N. Y.**  
**Cox, Justice, Jr., Philadelphia.**  
**Cotton, Bradley & Co., Philadelphia.**  
**Hoffman, J. W. & Co., Philadelphia.**  
**Leonard, J., 44 West St., N. Y.**  
**Naylor & Co., 45 Wall, N. Y.**  
**Nicolls, Wheeler & Co., Philadelphia.**  
**Ogden & Wallace, 85 Elm St., N. Y.**  
**Pickands, Brown & Co., Chicago, Ill.**  
**Pierston & Co., 24-27 West, N. Y.**  
**Richards, D. W. & Co., 88 Mangin St., N. Y.**  
**Valles, C. W. & Co., Albany &**  
Washington streets, N. Y.  
**Whitney, A. B. & Co., 17 B'way, N. Y.**  
**Wilson, E. H. & Co., Philadelphia.**  
**Iron, Importers.**  
**Abbott, Jere & Co., N. Y. and Boston.**  
**Lundberg, Gustaf, Boston, Mass.**  
**Iron, Sheet, Manufacturers of.**  
**Bradley & Steel Co., Bridgeport, O.**  
**Cambridge Iron & Steel Co., Cambridge,**  
Ohio.  
**W. Dewees Wood Co., Lim., McKees-**  
port, Pa.  
**Ironwork, Ornamental.**  
**Barum, E. T., Detroit, Mich.**  
**Champion Iron Co., Kenton, O.**  
**Long Fence & Wire Co., St. Louis, Mo.**  
**Ludlow-Saylor Wire Co., St. Louis, Mo.**  
**Mast, Foss & Co., Springfield, O.**  
**The Van Dorn Iron Works Co., Cleve-**  
land, O.  
**Keys.**  
**Wienask, J. F., Chicago, Ill.**  
**Ladders.**  
**Davies, Chas. & Co., Williamsport, Pa.**  
**Ladies.**  
**Detroit Fdy. Equipment Co., Detroit,**  
Mich.  
**Lamp Stoves.**  
**Stove Stove Co., Chelsea, Mich.**  
**Lanterns.**  
**Dietz, R. E. & Co., 60 Laight St., N. Y.**  
**Steam Gauge & Lantern Co., Syracuse,**  
N. Y.  
**Lathes.**  
**Bradford Mill Co., Cincinnati, Ohio.**  
**Detroit Machine Tool Co., Worcester,**  
Mass.  
**Johnson, Israel H., Jr., & Co., Phila-**  
delphia, Pa.  
**Sebastian Lathe Co., Cincinnati, O.**  
**Sebastian, May & Co., Sidney, O.**  
**Seneca Falls Mfg. Co., Seneca Falls,**  
N. Y.  
**Lathing, Wire.**  
**Clinton Wire Cloth Co., Clinton, Mass**  
N. Y.  
**Wire Cloth Co., Trenton, N. J.**  
**Wright & Colton Wire Cloth Co., Wor-**  
cester, Mass.  
**Lawn Mallets.**  
**Railway Speed Recorder Co., Kent, O.**  
**Lawson, James.**  
**Bingham, W. Co., Cleveland, O.**  
**Blair Mfg. Co., Springfield, Mass.**  
**Chadborn & Coldwell Mfg. Co., New**  
burr, N. Y.  
**Champion Mfg. Co., Richmond, Ind.**

**Coldwell Lawn Mower Co., Newburg,**  
N. Y.  
**E. & N. Mfg. Co., Richmond, Ind.**  
**Graham, Passmore & Co., Phila., Pa.**  
**Henley, M. C., Richmond, Ind.**  
**Lape, W. E., Syracuse, N. Y.**  
**Mast, Foss & Co., Springfield, O.**  
**Stearns, E. C. & Co., Syracuse, N. Y.**  
**Supplies Hdwn. Co., Phila., Pa.**  
**Lawn Rakes.**  
**Gibbs Mfg. Co., Canton, O.**  
**Schaeffer & Co., Dayton, Ohio.**  
**Syracuse Specialty Mfg. Co., Syracuse**  
N. Y.  
**Lawn Sprinklers.**  
**Blair Mfg. Co., Springfield, Mass.**  
**Ette & Henger Mfg. Co., St. Louis.**  
**McGowan, John H. Co., Cincinnati, O.**  
**Lawn Sweepers.**  
**Lape, W. E., Syracuse, N. Y.**  
**Lawn Swings.**  
**Davies, Chas. & Co., Williamsport, Pa.**  
**Lemon Squeezers.**  
**Ripley Mfg. Co., Unionville, Conn.**  
**Letters, Paper.**  
**Tablet & Ticket Co., Chicago, Ill.**  
**Levels.**  
**Davis & Cook, Watertown, N. Y.**  
**Richardson, C. F., & Son Athol, Mass**  
**Locks & Knobs, Manufacturers of.**  
**Keyes, A. E., 97 Chambers, N. Y.**  
**Keyless Lock Co., Chicago, Ill.**  
**Reading Hdwn. Co., Cincinnati, Pa.**  
**Romer & Co., Newark, N. J.**  
**Russell & Erwin Mfg. Co., New York.**  
**Sargent & Co., 37 Chambers St., N. Y.**  
**Smith & Edge Mfg. Co., Bridgeport,**  
Yale & Towne Mfg. Co., Stamford.  
**Lubricators.**  
**Lunkenheimer Co., Cincinnati, Ohio.**  
**Wadham's Oil & Grease Co., Milwaukee**  
Wis.  
**Machinery.**  
**Am. Tool Works, Cleveland, Ohio.**  
**Barnes, W. F. & John, Rockford, Ill.**  
**Becker, Jno. Mfg. Co., Fitchburg, Mass.**  
**Bement, Miles & Co., Philadelphia, Pa.**  
**Bertsch & Co., Cambridge City, Ind.**  
**Bigelow, C. E., 45 Day, N. Y.**  
**Bignall & Keeler Mfg. Co., St. Louis.**  
**Birmingham Iron Foundry, Birming-**  
ham, Conn.  
**Bliss, E. W. Co., Brooklyn, N. Y.**  
**Bogert, Jno. L.,ushing, N. Y.**  
**Bradford Mfg. Co., Cincinnati, Ohio**  
**Briggs, Marvin, 12 Broadway, N. Y.**  
**Brown & Sharpe Mfg. Co., Providence,**  
R. I.  
**Carlin's Sons, Thos., Allegheny, Pa.**  
**Cinn. Milling Mch. Co., Cincinnati,**  
Ohio.  
**Clapp, Geo. M., agt., 74 Cortlandt, N. Y.**  
**Coulter & McKenzie Mch. Co., Bridge-**  
port, Conn.  
**Cruikshank, D. B., Providence, R. I.**  
**Davis, W. P., Rochester, N. Y.**  
**Detrick & Harvey Mch. Co., Balti-**  
more, Md.  
**Fitchburg Mch. Works, Fitchburg,**  
Mass.  
**Garvin Mch. Co., Laight & Canal Sts.**  
**Gould & Eberhardt, Newark, N. J.**  
**Harrington, E. Son & Co., Phila., Pa.**  
**Hender Machine Co., Torrington, Ct.**  
**Henley Mch. Tool Wks., Richmond, Ind**  
**Hill, Clarke & Co., Boston, Mass.**  
**Ingersoll Milling Machine Co., Rock-**  
ford, Ill.  
**Johnson, Israel H., Jr., & Co., Phila.**  
**Jones & Lamson Mch. Co., Springfield**  
Vt.  
**Lodge & Davis Mch. Tool Co., Cincin-**  
nati, O.  
**Lodge & Shipley Mch. Tool Works,**  
Cincinnati, O.  
**Lovegrove & Co., Philadelphia, Pa.**  
**McCabe, J. J., 68 Cortlandt, N. Y.**  
**Machinists Supply Co., Rochester, N. Y.**  
**Manville, E. J. Mch. Co., Waterbury,**  
Conn.  
**National Machinery Co., Tiffin, Ohio.**  
**Newark Mch. Tool Works, Newark, N. J.**  
**New Haven Mfg. Co., New Haven, Conn.**  
**New York Mach'y Depot, N. Y.**  
**Niles Tool Wks., 138 Liberty St., N. Y.**  
**Pedrick & Ayer, Philadelphia, Pa.**  
**Pittsburgh Mfg. Co., Pittsburgh, Pa.**  
**Place, Geo., 120 Broadway, N. Y.**  
**Pool, Robt. & Son Co., Baltimore, Md.**  
**Powell Planer Co., Worcester, Mass.**  
**Pratt & Whitney Co., Hartford, Conn.**  
**Prentiss Tool & Supply Co., N. Y.**  
**Reed, J. B., Cairo, Ill.**  
**Scranton Supply & Mchry. Co., Scrant-**  
on, Pa.  
**Sellers, Wm. & Co., Phila.**  
**Seyffert's Sons L. F., Philadelphia, Pa.**  
**Stephens, J. & Co., Cincinnati, O.**  
**Stow Flexible Shaft Co., Ltd., Phila.**  
**Toomey, Frank, Philadelphia, Pa.**  
**Wetherill, Robert & Co., Chester, Pa.**  
**Wilson, W. A., Rochester, N. Y.**  
**Woodruff Mfg. Co., Hartford, Conn.**  
**Machinery for Hardware Manu-**  
facture.  
**Adt, Jno. & Son, New Haven, Conn.**  
**Machine Knives.**  
**Loring Coes & Co., Worcester, Mass.**  
**Machine Tools.—See Machinery.**  
**Machine Work.**  
**Angus, C. H., Albany, N. Y.**  
**Machinists.**  
**Best, Fox & Co., Pittsburgh, Pa.**  
**Machinists' Scales.**  
**Coffin & Leighton, Syracuse, N. Y.**  
**Starrett, L. S., Athol, Mass.**  
**Machinists' Tools and Supplies.**  
**Brown & Sharpe Mfg. Co., Providence,**  
King, J. M. & Co., Watford, N. Y.  
**Sellers, Wm. & Co., Inc., Phila.**  
**Mallets.**  
**N. Y. Mallet & Handle Works, N. Y.**  
**Mangers.**  
**Worthley's Broad Gauge Iron Stall**  
Works, Boston, Mass.  
**Manufacturing Sites.**  
**Freeman & Iron Co., East St.**  
Louis Ill.  
**Illinois Central R. R. Co., Chicago, Ill.**  
**Kokomo Enterprise Co., Kokomo, Ind.**  
**Measuring Tapes.**  
**Cutkin Rule Co., Saginaw, Mich.**  
**Meat Cutters.**  
**Enterprise Mfg. Co., Philadelphia, Pa.**  
**Mechanical Drawing.**  
**Correspondence School of Mechanics**  
Scranton, Pa.  
**Metals.**  
**Fearing, Wm. S., 100 Chambers, N. Y.**  
**Hendricks Bros., 49 Cliff, N. Y.**  
**Naylor & Co., 45 Wall, N. Y.**

**Metal Brokers.**  
 American Metal Co., N. Y.  
**Metallurgists.**  
 Barton, J., Blodgett, Phila.  
**Metal Saws.**  
 Ehrhardt, Gastave & Sons, Pittsburg, O. & C. Co., Chicago, Ill.  
**Milling Machines.**  
 Brown & Sharpe, Providence, R. I.  
 Cln. Milling Mch. Co., Cincinnati, Ohio.  
 Ingersoll Milling Machine Co., Rockford, Ill.  
 Pedrick & Ayer, Phila. Pa.  
**Mining Knives.**  
 Palmer Hdw. Mfg. Co., Troy, N. Y.  
**Mine Lamps.**  
 Darby, Edw. & Sons, Phila. Pa.  
 Leonard, E. E., Scranton, Pa.  
 Leonard, T. F., Scranton, Pa.  
**Mining Engineers.**  
 Leofred, A., Quebec, Canada.  
**Mining Screens.**  
 Harrington & King Perforating Co., Chicago, Ill.  
 Howard & Morse, 45 Fulton, N. Y.  
**Minnow Traps.**  
 Wilson, Ed. C., Olney, Ill.  
**Model Work.**  
 Hurley Bros., Hartford, Conn.  
**Molding Sand.**  
 Chicago Foundry Supply Co., Chicago, Ill.  
 Obermayer, S. C., Cincinnati, O.  
 Paxson, J. W. & Co., Phila.  
 Whitehead Bros. Co., 517 W. 15th St., N. Y.  
**Motors, Water and Electric.**  
 C. & C. Electric Motor Co., 402 and 404 Greenwich St., N. Y.  
 Thomson, Houston Motor Co., Boston, Mass.  
**Nail Machinery.**  
 Pittsburgh Mfg. Co., Pittsburg, Pa.  
**Nails (Cut) and Spikes.**  
 Borden & Lovell, 70 West, N. Y.  
 Cumberland Nail & Iron Co., Phila.  
 Oxford Iron Co., 81 Washington, N. Y.  
 Pottstown Iron Co., Pottstown, Pa.  
 Riverside Iron Wks., Wheeling, W. Va.  
 Stebbins, C. J., 103 Reade, N. Y.  
**Nickel Platers' Supplies.**  
 Hanson & Van Winkle Co., Newark, N. J.  
 Zuckert & Levett Chemical Company, 10 to 14 Grand St., N. Y.  
**Norway Shapes, Rollers of.**  
 Rowland, William & Harvey, Framford, Philadelphia  
**Nut Machines.**  
 Dunham Nut Mch. Co., Unionville, O.  
**Nuts, Bolts, &c., Makers of.**  
 American Bolt Co., Lowell, Mass.  
 American Screw Co., Providence, R. I.  
 Blake & Johnson, Waterbury, Conn.  
 Haskell, Wm. H. Co., Pawtucket, R. I.  
 Port Chester Bolt and Nut Co., Port Chester, N. Y.  
 Russell, Burdall & Ward, Port Chester, N. Y.  
 Sternberg, J. H. & Son, Reading, Pa.  
 Wilson, J. F., Worcester, Mass.  
 Wm. H. Haskell Co., Pawtucket, R. I.  
**Oil Cans and Lubricators.**  
 Sherwood Mfg. Co., Buffalo, N. Y.  
**Oil and Grease Cans.**  
 Lunkenheimer Co., Cincinnati, Ohio.  
**Oil Stones.**  
 Pike Mfg. Co., Pile Station, N. Y.  
**Oil Stoves.**  
 Glazier Stove Co., Chelsea, Mich.  
 Henry, J. T. Mfg. Co., Hamden, Conn.  
**Ores.**  
 Wistar, Francis, Philadelphia, Pa.  
**Presses.**  
 Beranton Forging Co., Scranton, Pa.  
 Woodruff, Walter W. & Sons, Mt. Carmel, Conn.  
**Pressing.**  
 Billington, Jas. H. & Co., Phila., Pa.  
 Morris, Robt., St. Louis, Mo.  
 N. Y. Belting & Packing Co. Ltd., N. Y.  
**Presses.**  
 Ames Sward Co., Chicopee, Mass.  
 Fram, E. T., Lancaster, Pa.  
 Hillebrand & Wolf, Phila., Pa.  
 Miller Lock Co., Philadelphia, Pa.  
**Presses.**  
 Detroit Graphite Mfg. Co., Detroit, Mich.  
 Dixon, Jos. Crucible Co., Jersey City, N. J.  
**Presses.**  
 Dangler Stove & Mfg. Co., Cleveland, O.  
**Presses.**  
 Ashley, J. A., Washington, D. C.  
 Fitzgerald, S. C., Washington, D. C.  
 Howard & Brown, Phila. & Washgton.  
 Jenner, H. W., Washington, D. C.  
 Faine & Ladd, Washington, D. C.  
 Stocking, E. B., Washington, D. C.  
**Presses and Coffee Roasters.**  
 Olsen, A. B., Kansas City, Mo.  
**Presses and Metal.**  
 Clinton Wire Cloth Co., Clinton, Mass.  
 Harrington & King Perforating Co., Chicago, Ill.  
**Phosphor Bronze.**  
 Phosphor Bronze Smelting Co., Limited, 512 Arch, Philadelphia.  
**Phosphor Tin.**  
 Crescent Phosphorized Metal Co., Philadelphia, Pa.  
 Crosby Steam Gauge & Valve Co., Boston, Mass.  
 Hale & Wadmann, 516 Pearl, N. Y.  
**Picks and Mattocks.**  
 Plumb, Fayette K., Philadelphia, Pa.  
**Pig Iron.**  
 Houston, C. B. & Co., Philadelphia, Pa.  
 Mann, Edwin R., Philadelphia, Pa.  
 Monitor Iron & Steel Co., Danville, Pa.  
 Taylor & Co., Mass., N. Y.  
 Pickands, Brown & Co., Chicago, Ill.  
 Pilling & Crane, Philadelphia, Pa.  
 Samuel, Frank, Philadelphia, Pa.  
**Pig Iron Storage.**  
 Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.  
**Pile Drivers.**  
 Vulcan Iron Wks., Chicago, Ill.  
**Pile, Bent.**  
 National Pipe Bending Co., New Haven  
**Pipe Cutting and Threading Machines.**  
 Bignall & Keeler Mfg. Co., St. Louis, Mo.  
 Morrill Mfg. Co., Toledo, O.  
 Fannon & Maule, Philadelphia.  
 Saunders & Sons, D. Yonkers, N. Y.  
**Pipe Crips.**  
 Prentiss Vase Co., 44 Barclay, N. Y.  
**Pipes, Fluted, &c., Makers of.**  
 McAb & Harlin Mfg. Co., N. Y.  
**Pipe, Water and Gas. Makers of.**  
 Cumberland Nail & Iron Co., Phila, Pa.

Donaldson Iron Co., Emaus, Pa.  
 Riverside Iron Works, Wheeling, W. Va.  
**Plane Irons, Manufacturers of.**  
 Buck Bros., Milbury, Mass.  
**Planes, Manufacturers of.**  
 Stanley Rule & Level Co., N. Y.  
**Plate, Iron and Steel, Mfgs of.**  
 Ema Iron & Steel Co., Bridgeport, O.  
 Lukens Iron & Steel Co., Coatesville, Pa.  
 Moorhead-McLean Co., Pittsburgh, Pa.  
 McMillan & Sons, Reading, Pa.  
 Pottstown Iron Co., Pottstown, Pa.  
 Pottsville Iron & Steel Co., Pottsville, Pa.  
 Singer, Nimick & Co., Pittsburgh, Pa.  
 The Mahoning Valley Iron Co., Youngstown, O.  
 Wallman Iron & Steel Co., Thurlow, Pa.  
 Wood Alan Co., Philadelphia.  
**Plating, Nickel, Brass and Silver.**  
 Angus, C. H., Albany, N. Y.  
 Shepard Hdw. Co., Buffalo, N. Y.  
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.  
**Plumbago.**  
 Chicago Fdy. Supply Co., Chicago, Ill.  
**Plows.**  
 Ross, A. M. & Co., Illion, N. Y.  
**Pokers and Lifters.**  
 Troy Nickel Works, Troy, N. Y.  
**Polishing Machines.**  
 Watson & Stillman, 204 E. 43d, N. Y.  
**Polishing Wheel.**  
 La Massena, C. E. & Co., Newark, N. J.  
**Post Hole Diggers.**  
 Buckeye Mfg. Co., Union City, Ind.  
 Gibbs Mfg. Co., Canton, Ohio.  
 St., New York.  
 Graham, John H. & Co., 113 Chambers  
 Kohler, F. E. & Co., Canton, O.  
 Wister, L. R. & Co., Philadelphia, Pa.  
**Poultry Nettings.**  
 Barnum, E. T., Detroit, Mich.  
 Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.  
 N. J. Wire Cloth Co., Trenton, N. J.  
 Wright & Colton Wire Cloth Co., Worcester, Mass.  
**Powder.**  
 Ladin & Rand Powder Co., 29 Murray  
 New York Powder Co., 62 Liberty St., N. Y.  
**Power Hack Saws.**  
 Millers Falls Co., 95 Reade St., N. Y.  
 Stover Novelty Wks., Freeport, Ill.  
**Power Hammers.**  
 Bradley & Co., Syracuse, N. Y.  
 Belden Mach. Co., New Haven, Conn.  
 Diemelt & Eisenhardt, Philadelphia.  
 Dupont Mfg. Co., St. Johnsbury, Vt.  
 American Hammer Co., Cleveland, O.  
 Jenkins & Linsie, Bellefont, Pa.  
 Long & Allstatter Co., Hamilton, Ohio.  
**Power Punches and Shears.**  
 Eaton, Geo. H. & Co., Boston, Mass.  
 Ferracute Mch. Co., Bridgeton, N. J.  
 Long & Allstatter Co., Hamilton, Ohio.  
**Presses, Dies, &c.**  
 E. W. Bliss Co., Brooklyn, N. Y.  
 Crosby, G. A. & Co., Chicago, Ill.  
 Ferracute Mch. Co., Bridgeton, N. J.  
 Niagara Stamping and Tool Co., Buffalo, N. Y.  
 Stark Mch. & Tool Co., Buffalo, N. Y.  
 Stiles & Parker Press Co., Brooklyn, N. Y.  
 Waterbury Mch. Co., Waterbury, Conn.  
**Presses, Power, Makers of.**  
 Bliss, E. W. Co., Brooklyn, N. Y.  
 Eaton, Geo. H. & Co., Boston, Mass.  
 Manville, E. J. Mch. Co., Waterbury, Ct.  
 Merriman, A. H., Meriden.  
 Niagara Stamping and Tool Co., Buffalo, N. Y.  
 Stark Mch. & Tool Co., Buffalo, N. Y.  
 Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.  
**Pulley Fixings.**  
 Foley, J. W. & Co., Cincinnati, O.  
**Pulleys.**  
 Great Western Pin Co., Toledo, O.  
 Keystone Clutch & Mch. Wks., Phila., Pa.  
 Lake, J. H. & D. Co., Hornellsville, N. Y.  
 Reeves Pulley Co., Columbus, Ind.  
**Pulverizing Mill.**  
 Bradley Fertilizer Co., Boston, Mass.  
**Pumping Machinery.**  
 Dean Bros. Steam Pump Works, Indianapolis, Ind.  
 Hooker-Colville Steam Pump Co., Chicago, Ill.  
 Lucas, C. O. & Co., Greenville, Ohio.  
 McGowan, J. E. & Co., Cincinnati, O.  
 Maslin, J. & Son, Jersey City, N. J.  
 Norwalk Iron Wks. Co., So. Norwalk, Conn.  
 Southwark Fdy. & Mch. Co., Phila., Pa.  
 Valley Pump Wks., Easthampton Mass.  
 Worthington, Henry R., 86 & 88 Liberty St., N. Y.  
**Pumps, Makers of.**  
 Bellevue Pump Co., Bellevue, Iowa.  
 Deming Co., Salem, O.  
 Douglas, W. B., Middletown, Conn.  
 Mast, Foss & Co., Springfield, O.  
 Myers, F. E. & Bro., Ashland, O.  
 St. Joseph Pump Co., St. Joseph, Mo.  
**Pumps and Shears, Hand and Power.**  
 New Doty Mfg. Co., Janesville, Wis.  
 Niagara Stamping and Tool Co., Buffalo, N. Y.  
 Stark Mch. & Tool Co., Buffalo, N. Y.  
**Punching and Shearing Presses.**  
 E. W. Bliss Co., Brooklyn, N. Y.  
 Cockburn, Barrow & Mch. Co., Jersey City, N. J.  
 Oity, N. J.  
 Crosby, G. A. & Co., Chicago, Ill.  
 Stiles & Parker Press Co., Brooklyn, N. Y.  
 Wals & Roos, Punch & Shear Co., Cincinnati, Ohio.  
 Waterbury Farrel Foundry and Mch. Co., Waterbury, Conn.  
 Watson & Stillman, 204 E. 43d, N. Y.  
**Rails, Old and New.**  
 Hirsh, L. K., Chicago, Ill.  
 Perry, W. H. & Co., Providence, R. I.  
 Richards, J. E. & Co., Pittsburgh, Pa.  
**Railway Supplies.**  
 Scully Steel & Iron Co., Chicago, Ill.  
**Rat and Mouse Traps.**  
 Burditt & Williams, Boston, Mass.  
 Estey, W. S., 65 Fulton, N. Y.  
 Ripley Mfg. Co., Unionville, Conn.  
 Sun Mfg. Co., Greenfield, O.  
**Razors.**  
 Butcher, W. & S., 185 Duane St., N. Y.

Curley, J. & Bro., 6 Warren St., N. Y.  
 Electric Curley Co., 113 Chambers, N. Y.  
 Schmitz, E. Lothar, 93 Reade St., N. Y.  
 W. R. Torrey Razor Co., Worcester, Mass.  
**Referrators.**  
 Challenge Corn Planter Co., Grand Rapids, Mich.  
 Kankakee Mfg. Co., Kankakee, Ill.  
**Refrigerator Door Fasteners.**  
 Conroy, P. J. & Co., Philadelphia.  
**Rivets.**  
 Blake & Johnson, Waterbury, Conn.  
 Burden Iron Co., Tr. y. N. Y.  
 Cobb & Drew, Plymouth, Mass.  
 Henderson, Jas. S., 165 Greenwich, N. Y.  
 Plymouth Mills, Plymouth, Mass.  
 Sternberg, J. H. & Son, Reading, Pa.  
 Townsend, W. F. & Co., New Brighton, Pa.  
**Riveting Machines.**  
 Ad. Inc. & Sons, New Haven, Conn.  
**Roasters & Bakers.**  
 Matthal, Ingram & Co., Baltimore, Md.  
**Rock Drills.**  
 Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.  
 Drill Co., 23 Park Place, N. Y.  
**Rolling Mill Machinery.**  
 Birmingham Iron Fdry, Birmingham, Conn.  
 Booth, The Lloyd Co., Youngstown, O.  
 Leechburg Foundry & Mch. Co., Pittsburgh, Pa.  
 Mahoning Fdry & Mch. Co., Danville, Pa.  
 Morgan Construction Co., Worcester, Mass.  
 Robinson-Rea Mfg. Co., Pittsburgh.  
 Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.  
 Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.  
**Roll Lathes.**  
 Totten & Hogg Iron & Steel Fdry Co., Pittsburgh, Pa.  
**Rolls, Chills, Sand and Steel.**  
 Booth, The Lloyd Co., Youngstown, O.  
 Chicago Foundry Co., Chicago, Ill.  
 Garrison, A. Fdry. Co., Pittsburgh, Pa.  
 Johnson Foundry Co., Johnstown, Pa.  
 Seaman, Sleeth & Black, Pittsburgh.  
 Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.  
**Roofing.**  
 Berlin Iron Bridge Co., E. Berlin, Conn.  
 Boston Bridge Works, Boston, Mass.  
 Cambridge Roofing Co., Cambridge, O.  
 Johns, H. W. Mfg. Co., 87 Maiden Lane  
**Rope.**  
 Travers Bros. Co., 107 Duane St., N. Y.  
**Rope and Web Goods.**  
 Covert Mfg. Co., West Troy, N. Y.  
 Covert's Saddlery Wks., Farmer, N. Y.  
**Rope Wheels.**  
 Cresson, Geo. V. Co., Philadelphia, Pa.  
**Rubber Goods.**  
 Canfield, H. O., Bridgeport, Conn.  
**Railroad Machinery.**  
 Lufkin Rule Co., Saginaw, Mich.  
 Standard Tool Co., Athol, Mass.  
 Stanley Rule & Level Co., 29 Chambers, N. Y.  
**Sad Irons.**  
 Universal Sad Iron Co., Milwaukee, Wis.  
**Sand Paper.**  
 Beechey, Adams & Co., Phila., Pa.  
**Sandpaper.**  
 Cincinnati Mfg. Co., Cinn., Ohio  
**Sash Balances.**  
 Caldwell Mfg. Co., Rochester, N. Y.  
 Fullman Sash Balance Co., Rochester, N. Y.  
 Stewart & Baker, Rochester, N. Y.  
**Sash Cord and Sash.**  
 Morton, Thos., 65 Elizabeth, N. Y.  
 Ossawa Mills Co., Norwich, Conn.  
 Samson Cordage Works, Boston, Mass.  
 Smith & Egge, Mfg. Co., Bridgeport.  
**Sash Holders.**  
 Motley, Peter, Philadelphia, Pa.  
**Sash Pulleys.**  
 Ives, H. B. & Co., New Haven, Conn.  
 Empire Portable Forge Co., Lansingburg, N. Y.  
 Palmer Hardware Mfg. Co., Troy, N. Y.  
**Sash Pulley Marker.**  
 Shelly, W. & Son, Bristol, Conn.  
**Sash Weights.**  
 Brown, E. B. & Co., Philadelphia, Pa.  
**Sash Weight Fasteners.**  
 Skelly, J. W. & Son, Bristol, Conn.  
**Saws, Makers of.**  
 Atkins, E. C. & Co., Indianapolis, Ind.  
 Black, Henry & Sons, Phila., Pa.  
 Jennings, O. E. & Co., 97 Chambers, N. Y.  
 National Saw Co., 98 Reade St., N. Y.  
 Simonds Mfg. Co., Fitchburg, Mass.  
**Saw Sets.**  
 Kohler, F. E. & Co., Canton, Ohio.  
 Taintor Mfg. Co., 34-86 Chambers, N. Y.  
**Scales, Sawtooth.**  
 Burr, S. Co., Buffalo, N. Y.  
 Chadillon, John & Sons, 85-89 Cliff, N. Y.  
**Scrapers, Road.**  
 Am. Steel Scraper Co., Sidney, Ohio.  
 Kilbourne & Jacobs Mfg. Co., Columbus, O.  
 Sidney Steel Scraper Co., Sidney, O.  
**Screening Wire Holders.**  
 Fash & Hottes, Mascoutah, Ill.  
 Horsford, John, Monroeville, Ohio.  
**Screens, Door and Window.**  
 Phillips, A. J. & Co., Fenton, Mich.  
 Queen Anne Screen Co., Burlington, Vt.  
**Screw Cutting Machinery.**  
 Wiles & Russell Mfg. Co., Greenfield, Mass.  
**Screw Drivers.**  
 Alford & Berkele Co., 75 Chambers St., N. Y.  
 Brown, R. H. & Co., New Haven, Conn.  
 Chantrell Tool Co., Reading, Pa.  
 Gay & Parsons, Augusta, Me.  
 Mayhew, H. H. Co., Shelburne Falls, Mass.  
**Screw Plate and Pipe Cutter.**  
 Jarecki Mfg. Co., Erie, Pa.  
**Screws, Makers of.**  
 American Screw Co., Providence, R. I.  
 Blake & Johnson, Waterbury, Conn.  
 Wm. H. Haskell Co., Pawtucket.  
 Miles, F. S., 205 Quarry, Philadelphia.  
 National Screw & Tack Co., Cleveland, Ohio.  
 Reynolds & Co., New Haven, Conn.  
 Western Machine Screw Co., Worcester, Mass.  
**Scroll Saws.**  
 Barnes, W. F. & John, Rockford, Ill.  
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.  
**Set the Stones and Wheelstones.**  
 Pike Mfg. Co., Pike Sta'n, N. H.  
 Cleveland Stone Co., Cleveland, O.

Huron Grindstone Co., Port Austin, Mich.  
**Shafting, Makers of.**  
 Cresson, Geo. V. Co., Philadelphia, Pa.  
 Fairmount Mch. Co., Philadelphia, Pa.  
 Flatiron & Co., Cleveland, Ohio.  
 Sellers, Wm. & Co., Inc., Phila. Pa.  
 Stow Mfg. Co., Binghamton, N. Y.  
**Shaped Iron and Steel, Manufacturers of.**  
 Ema Iron & Steel Co., Bridgeport, O.  
 Allentown Rolling Mill, Phila.  
 Illinois Steel Co., Chicago, Ill.  
 Lockhart Iron & Steel Co., Pittsburg, Pa.  
 Passaic Rolling Mill Co., Paterson, N. J.  
 Pottsville Iron & Steel Co., Pottsville, Pa.  
 Roberts, A. & P. & Co., Phila., Pa.  
 The Phoenix Iron Co., Phila., Pa.  
 Tudor Iron Works, St. Louis, Mo.  
**Shears and Scissors.**  
 Ames Shear Co., Bridgeport, Conn.  
 Heinshofs, R. Sons Co., Newark, N. J.  
**Sheet Iron and Steel, Manufacturers of.**  
 Ema Iron and Steel Co., Bridgeport, Cambridge Iron & Steel Co., Cambridge, Ohio.  
 Oness Bros., Pittsburgh, Pa.  
 Moorehead-McCleane Co., Pittsburgh.  
 Pierson & Co., 24-29 West St., N. Y.  
 Rely, John W., Fort Hunter P. O., Pa.  
 Singer, Nimick & Co., La., Pittsburgh, Pa.  
 The Mahoning Valley Iron Co., Youngstown, O.  
 Alan Wood Co., Philadelphia.  
 W. Dewees Wood Co., McKeesport, Pa.  
**Sheet Zinc.**  
 Mathieson & Hegeler Zinc Co., La Salle, Ill.  
**Shelf Brackets.**  
 Koch, A. B. & Co., Peoria, Ill.  
**Shipping Blanks.**  
 Barclay, J. & Co., Grand Rapids, Mich.  
**Shovels, Spades and Scoops.**  
 Ros. A. M. & Co., Illion, N. Y.  
**Shutter Workers.**  
 Tyson & Zimmermann, Frederick, Md.  
**Sinks.**  
 Douglas, W. & B., Middletown Conn.  
**Sinks, Ice.**  
 James, Stoddard & Kendall, Boston, Mass.  
 Winslow, Sam'l., Skate Mfg. Co., Worcester, Mass.  
**Skates, Roller.**  
 Henley, M. C., Richmond, Ind.  
 Union Hardware Co., Torrington, Conn.  
 Winslow, Sam'l., Skate Mfg. Co., Worcester, Mass.  
**Skylights.**  
 Plenty Horticultural & Skylight Wks., 145 Liberty St., N. Y.  
**Smelting Works.**  
 Reeves, Paul S., 760 S. Broad, Phila.  
**Speaking Wks.**  
 Ostrander, W. R. Co., N. Y.  
 Wollensak, J. F., Chicago, Ill.  
**Specialties, Pat. Articles.**  
 Konigsloew, O., Cleveland, O.  
**Speed Indicators.**  
 Church & Slight, 103 Fulton St., N. Y.  
**Spelter.**  
 Mathieson & Hegeler Zinc Co., La Salle, Ill.  
**Spoons and Forks.**  
 Holmes & Edwards Silver Co., Bridgeport, Conn.  
 Rogers, The Wm. Mfg. Co., Hartford, Conn.  
**Spraying Goods.**  
 Hartley & Graham, 313-315 B'way, N. Y.  
**Springs.**  
 Am. Spiral Spring Co., Pittsburg, Pa.  
 Dunbar Bros., Bristol, Conn.  
 Haley Mfg. Co., Concord, N. H.  
 Miller & an Inkley, Brooklyn, N. Y.  
 Morgan Spring Co., Worcester, Mass.  
 Nourse, Fred, 168 W. 27th St., N. Y.  
 Sabin Machine Co., Montpelier, Vt.  
 Tuok Mfg. Co., Brockton, Mass.  
 Washburn & Moen Mfg. Co., Worcester, Mass.  
 Wolf, R. H. & Co., Ltd., 118th St. and Erie, N. Y.  
**Spring Hinges.**  
 Bardsley, J., 149 & 151 Baxter St., N. Y.  
 Fullman Sash Balance Co., Rochester, N. Y.  
 Shepard Hdw. Co., Buffalo, N. Y.  
 Stover Mfg. Co., Freeport, Ill.  
 Van Wagoner & Williams Co., 14 Warren St., N. Y.  
**Spring Keys and Cotters.**  
 Jencks Mfg. Co., Pawtucket, R. I.  
 Whitman & Barnes Mfg. Co., Syracuse, N. Y.  
**Sprinklers.**  
 Shepard, Wm. J. & Co., Buffalo, N. Y.  
 Smith, Oliver A., Clarkston, Mich.  
**Stamped Ware.**  
 Am. Stamping Co., 104 & 106 John St., New York  
**Stamping Works.**  
 Avery Stamping Co., Cleveland, O.  
 Cleveland Stamping & Tool Co., Cleveland, O.  
**Staples.**  
 Cobb & Drew, Plymouth, Mass.  
 Titchener E. H. & Co., Binghamton, N. Y.  
**Steam Gauges.**  
 Ashcroft Mfg. Co., 111 Liberty St., N. Y.  
 Bristol Mfg. Co., Waterbury, Conn.  
**Steam Engines, Dies, Makers of.**  
 Diemelt & Eisenhardt, Philadelphia.  
 Dudgeon, Richard, 24 Columbia Street, N. Y.  
**Steam Heating.**  
 Webster Warren & Co., Phila., Pa.  
**Steam Separators.**  
 Goulet Mfg. Co., 83 Cortland St., N. Y.  
 Harrison Safety Boiler Wks., Phila. Pa.  
**Steel Balls.**  
 Grant Anti-Friction Ball Co., Fitchburg, Mass.  
**Steel, Cold Rolled Strip.**  
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.  
**Steel Figures and Alphabets.**  
 Krogsrud, W., 61 Fulton, N. Y.  
**Steel Importers.**  
 Abbott, Jere & Co., N. Y. and Boston.  
 Hobson, Francis, Seaman & Co., 99 John St., N. Y.  
 Jessop, Wm. J. & Sons, Sheffield, Eng.  
 land, or St. John, N. Y.  
 Mine, A. & Co., 1 Broadway, N. Y.  
 Newton & Shipman, 83 John, N. Y.  
 Wetherell Bros., 93 Liberty St., N. Y.  
 Whitney, A. R. & Co., B'way, N. Y.  
 Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.



**Steel (Mushet's Special).**  
Jones, B. M. & Co., Boston.

**Steel Manufacturers.**  
Atlas Iron & Steel Co., Bridgeport, O.  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Baker, Herman & Co., 103 Duane St.  
Buffalo Steel Foundry, Buffalo, N. Y.  
Carbon Steel Co., Pittsburgh, Pa.  
Chester Steel Castings Co., Phila., Pa.  
Chrome Steel Works, Brooklyn, N. Y.  
Crescent Steel Co., Pittsburgh, Pa.  
Frankford Steel Co., Philadelphia.  
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.  
Hobson, Francis, Seaman & Co., 97 John St., N. Y.  
Illinois Steel Co., Chicago, Ill.  
Jessor, Wm. & Sons, Sheffield, Eng. land, or 91 John, N. Y.  
Jones, B. M. & Co., Boston, Mass.  
Kaiser, Elison & Co., Sheffield, Eng.  
La Belle Steel Co., Pittsburgh, Pa.  
Lukens Iron & Steel Co., Coatesville, Pa.  
Moorhead-McCleane Co., Pittsburgh, Pa.  
Moss, J. W., 88 John N. Y.  
Naylor & Co., 45 Wall, N. Y.  
Pennsylvania Steel Co., Steelton, Pa.  
Peterson & Co., 24-27 West, N. Y.  
Pottsville Iron and Steel Co., Pottsville, Pa.  
Rely, J. W., Fort Hunter P. O., Pa.  
Rowland, Wm. & Harvey, Frankford Philadelphia.  
Singer, Nimick & Co., Pittsburgh.  
Staley Works, New Britain, Conn.  
Steel & Iron Improvement Co., Pittsburgh, Pa.  
Taylor Iron & Steel Co., High Bridge, N. J.  
Wordlaw, S. C. & Sheffield, Eng.  
Wetherell Bros., 93 Liberty, N. Y.  
Wilmut & Hobbs Mfg. Co., Bridgeport Conn.

**Steel Manufacturers' Agents.**  
Barnes, C. K. & Co., Philadelphia, Pa.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Lindsay, Jas. G. & Co., Phila., Pa.  
**Steel Rails, Manufacturers of.**  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Cambria Iron Co., Johnstown, Pa.  
Illinois Steel Co., Chicago, Ill.  
Penna. Steel Co., Steelton, Pa.  
Montour Iron & Steel Co., Danville, Pa.  
Riverside Iron Wks., Wheeling, W. Va.  
**Steel Spiral Springs, Manufacturers of.**  
Chadillon, John & Sons, N. Y.  
Roland, Wm. & Harvey, Frankford.  
Wolff, R. H. & Co., Ltd., 118 Street and Harlem River, N. Y.

**Steel Tools.**  
Frankford Steel Co., Philadelphia, Pa.  
Jessor, Wm. & Sons, Sheffield, Eng. land, or 91 John, N. Y.  
La Belle Steel Co., Pittsburgh, Pa.

**Step Ladders.**  
Bicycle Step Ladder Co., Chicago, Ill.  
Croissant, M., Albany, N. Y.

**Stoves and Pies.**  
Armstrong, Bridgeport, Conn.  
Billings & Spencer Co., Hartford, Conn.  
Butterfield & Co., Derby Line, Vt.  
Hart Mfg. Co., Cleveland, O.  
Saunders' Sons, D., Yonkers, N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.

**Stove Linings.**  
Ostrander Fire Brick Co., Troy, N. Y.  
**Stove Pipe Thimbles.**  
Cheney, S. & Son, Manlius, N. Y.  
**Stove Trimmings.**  
Troy Nickel Works, Troy, N. Y.  
**Street Lamps.**  
Dietz, R. E. Co., 60 Light St., N. Y.  
Steam Gauge & Lantern Co., Syracuse, N. Y.

**Strops.**  
Electric Outlery Co., 113 Chambers, N. Y.  
J. R. Torrey & Co., Worcester, Mass.  
**Strapping Machines.**  
Schmitz, E. Lothar, 92 Reade St., N. Y.  
**Structural Iron Work.**  
Berlin Iron Bridge Co., East Berlin, Conn.  
Boston Bridge Wks., Boston, Mass.  
Lindsay, Jas. G. & Co., Phila., Pa.  
Wrought Iron Bridge Co., Canton, O.

**Sulphuric Acid.**  
Mathieson & Hegeler Zinc Co., La Salle, Ill.  
**Tacks, Brads, Staples, &c.**  
Atlas Tack Corporation, Boston, Mass.  
A. Field & Sons, Taunton, Mass.  
Cobb & Drew, Plymouth, Mass.  
Grand Crossing Tack Co., Grand Crossing, Ill.

**Nat. Screw & Tack Co., Cleveland O.**  
Phillips, E. & Sons, South Hanover.  
Plymouth Mills, Plymouth, Mass.  
Trafant, W. E., Whitman, Mass.

**Paps and Dies.**  
Futterfield & Co., Derby Line, Vt.  
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.  
Manning, Maxwell & Moore, 111 Liberty St., N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.

**Testing Laboratories.**  
Richie Bros. Testing Mch. Co., Philadelphia.

**Testing Machines.**  
Richie Bros. Testing Mch. Co., Phila.  
**Theoretical Hardware.**  
Wollensak, J. F., Chicago, Ill.

**Tool Springs.**  
Frost Thill Spring Co., Boston, Mass.  
Sabin Machine Co., Montpelier, Vt.

**Time Record.**  
Scattergood, H. W., Phila., Pa.  
**Tinners' Hardware.**  
Berger Bros., Philadelphia, Pa.

**Tinning Processes.**  
Sands, Thomas, Nashua, N. H.  
**Tin Plate Machinery.**  
Lloyd Booth Co., Youngtown, Ohio.

**Tinware.**  
Am. Stamping Co., 104 & 108 John St., Matthal, Ingram & Co., Baltimore, Md.

**Tire Upsetters.**  
Butts & Ordway, Boston, Mass.  
Hills Iron & Bolt Co., Carpentersville, Ill.

**Toe Calks, Steel.**  
Burke, P. F., Boston, Mass.  
**Tool Chests.**  
Am. Tool Co., 200 W. Houston St., N. Y.  
Jennings C. E. & Co., 97 Chambers St.

**Tool Racks.**  
Herrick, F. A. & Co., Jackson, Mich.  
**Tools.**  
Atkins, E. C. & Co., Indianapolis, Ind.  
Britton, Horace E., Stoughton, Mass.  
Brown, R. H. & Co., New Haven, Conn.  
Chantrell Tool Co., Reading, Pa.  
Cincinnati Tool Co., Cincinnati, O.  
Fray, Jno. S. & Co., Bridgeport, Conn.  
Jennings, C. E. & Co., 97 Chambers, N. Y.  
Krauter & Co., Newark, N. J.  
Mayhew, H. H. Co., Shelburne Falls, Mass.

**Tools, Steam and Gas Fitters'**  
Saunders' Sons, D., Yonkers, N. Y.  
**Torches, Oil and Gasolene.**  
Dangler Stove & Mfg. Co., Cleveland, O.  
Schneider & Trenkamp Co., Cleveland, Ohio.

**Transom Lifters.**  
Wollensak, F. Co., Chicago, Ill.

**Tree Protectors.**  
McCallip Fence & Wire Wks., Columbus, Ohio.

**Trucks, Manufacturers of.**  
Berger Bros., Philadelphia, Pa.  
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.  
Clark, G. P. & Co., Bridgeport, Conn.  
Lansing Wheelbarrow Co., Lansing, Mich.

**Tubes, Seamless Drawn Copper.**  
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.  
Randolph & Clowes, Waterbury, Conn.

**Tube Steel.**  
Shelby Steel Tube Co., Shelby, O.

**Tumbling Barrels.**  
Henderson Bros., Waterbury, Conn.

**Turnbuckles.**  
Central Iron & Steel Co., Brazil, Ind.  
Cleveland City Forge & Iron Co., Cleveland, O.  
Merrill Bros., Brooklyn, E. D.

**Twist Drills, Makers of.**  
Cleveland Twist Drill Co., Cleveland.  
Morse Twist Drill & Machine Co., New Bedford, Mass.

**New Process Twist Drill Co., Taunton, Mass.**  
Standard Tool Co., Cleveland.

**Valves, Gas, Water and Steam.**  
Chapman Valve Works, Buffalo, N. Y.  
Jenkins Bros., 71 John, N. Y.  
Lunkenhelm Co., Cincinnati, Ohio.  
McNab & Harlin Mfg. Co., 60 John N. Y.  
Mason Regulator Co., Boston, Mass.

**Ventilating Fans.**  
Huyett & Smith Mfg. Co., Detroit, Mich.

**Ventilator Appliances.**  
Howard & Morse, 45 Fulton, N. Y.

**Vise Jaws.**  
Newark Mch. Tool Co., Newark, N. J.

**Welds.**  
Hollands Mfg. Co., Erie, Pa.  
Howard Iron Works, Buffalo, N. Y.  
Millers Falls Co., 93 Reade St., N. Y.  
Prentiss Vise Co., 44 Barclay N. Y.  
Tower & Lyon, 95 Chambers St., N. Y.  
Van Wagoner & Williams Co., 14 Warren St., N. Y.

**Wagon Jacks.**  
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.  
Covert Mfg. Co., West Troy, N. Y.  
Covert's Saddlery Works, Farmer, N. Y.

**Washers.**  
Haskell, Wm. H. Co., Pawtucket, R. I.  
Lanman, E. B., Columbus, Ohio.  
Milton Mfg. Co., Milton, Pa.  
Sternberg, J. & Son, Reading, Pa.

**Washing Machines.**  
Diether & Barrows, Ft. Wayne, Ind.  
Huenefeld, E. H., Cincinnati, Ohio.  
Olds Wagon Works, Ft. Wayne, Ind.  
Wayne, A. Mfg. Co., Ft. Wayne, Ind.

**Water Meters.**  
Wright & Heury R., 86 & 88 Liberty St., N. Y.

**Water Wheels.**  
Pole, Robt. & Son Co., Baltimore, Md.

**Well Boring Machines.**  
Oil Well Supply Co., Pittsburgh, Pa.

**Well Machinery.**  
Amer. Well Works, Aurora, Ill.  
Arnold Metal Wheel Co., New London, O.

**Wheelbarrows.**  
Akron Tool Co., Akron, O.  
Amer. Steel Scraper Co., Sidney, Ohio.  
Cockburn Barrow & Mch. Co., Jersey City, N. J.  
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.

**Wheelbarrow Co., Lansing, Mich.**  
S'ney Steel Scraper Co., Sidney, O.  
Sweat Mfg. Co., Minneapolis, Minn.  
Toledo Wheelbarrow Wks., Toledo, O.

**Whips.**  
American Whip Co., Westfield, Mass.

**Window Cord, Makers of.**  
Samson Cordage Works, Boston, Mass.

**Wire, Manufacturers of.**  
Amer. Spiral Spring Co., Pittsburgh, Pa.  
Amer. Wire Nail Co., Anderson, Ind.  
Consolidated Steel & Wire Co., St. Louis, Mo.

**Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.**  
Haley Mfg. Co., Concord, N. H.  
Miller & Van Winkle, Brooklyn, N. Y.

**New Castle Wire Nail Co., New Castle, Pa.**  
New Haven Wire Mfg. Co., New Haven, Conn.

**Prentiss Geo. W. & Co., Holyoke, Mass.**  
Salem Wire Nail Co., Salem, O.  
Trenton Iron Co., Trenton, N. J.

**Washburn & Moen Mfg. Co., Worcester, Vt.**  
Wetherill Bros., 93 Liberty St., N. Y.  
Wolff, E. H. & Co., Ltd., 118th St. and Harlem River, N. Y.

**Wright & Colton Wire Cloth Co., Worcester, Mass.**  
**Wire Cloth.**  
Barum, E. T., Detroit, Mich.

**Clinton Wire Cloth Co., Clinton, Mass.**  
Derry, Edward & Sons, Philadelphia.  
Wester, W. S., 65 Fulton, N. Y.

**Gilbert & Bennett Mfg. Co., 42 Cliff.**  
Howard & Morse, 45 Fulton, N. Y.  
N. J. Wire Cloth Co., Trenton, N. J.

**Reliance Wire Wks. Co., Milwaukee, Wis.**  
Scheeler & Sons, Buffalo, N. Y.  
Wickwire Bros., Cortland, N. Y.

**Wright & Colton Wire Cloth Co., Worcester, Mass.**  
W. S. Tyler Wire Works Co., Cleve'd.

**Wire Cutters.**  
Crouk Hanger Co., Elmira, N. Y.  
King, J. M. & Co., Watertown, N. Y.

**Wire Dies.**  
McFarland Wm., Trenton, N. J.  
Newton & Shipman, 83 John, N. Y.

**Wire Door Mats.**  
Hartman Mfg. Co., Beaver Falls, Pa.  
The Wire Goods Co., Worcester, Mass.

**Wire Goods, Manufacturers of.**  
Darby, Edward & Sons, Phila.  
Gilbert & Bennett Mfg. Co., N. Y.

**E. Jencks Mfg. Co., Pawtucket, R. I.**  
Lange Fence & Wire Co., St. Louis, Mo.  
Ludlow-Saylor Wire Co., St. Louis.

**Oswawa Mills Co., Norwich, Conn.**  
Scheeler & Sons, Buffalo, N. Y.  
Whitman & Barnes Mfg. Co., Syracuse, N. Y.

**Wire Goods Co., Worcester, Mass.**  
Wickwire Bros. Cortland, N. Y.  
Williamson, C. T. Wire Novelty Co., Newark, N. J.

**Wire Machinery.**  
Am. Tool Wks., Cleveland, O.  
Manville, E. J. Mch. Co., Waterbury, Ct.

**Morgan Construction Co., Worcester, Mass.**  
Waterbury Mch. Co., Waterbury, Conn.

**Wire Straightening and Cutting Machinery.**  
Adt, John & Son, New Haven, Conn.

**Wire Nails.**  
Amer. Wire Nail Co., Anderson, Ind.  
Baackes Wire Nail Co., Cleveland, O.

**Consolidated Steel & Wire Co., St. Louis, Mo.**  
Field, A. & Sons, Taunton, Mass.  
Indiana Wire Fence Co., Crawfordsville, Ind.

**Kilms Mfg. Co., Newburg, N. Y.**  
New Castle Wire Nail Co., New Castle, Pa.

**Phillips, E. & Sons, South Hanover Mass.**  
Phillips, Townsend & Co., Phila., Pa.  
Plymouth Mills, Plymouth, Mass.

**Salem Wire Nail Co., Salem, O.**  
Wolff, E. H. & Co., New York City.

**Wire Ropes, Steel.**  
Amer. Wire Nail Co., Anderson, Ind.  
Consolidated Steel & Wire Co., St. Louis, Mo.

**Illinois Steel Co., Chicago, Ill.**  
New Castle Wire Nail Co., New Castle, Pa.

**Washburn & Moen Mfg. Co., Worcester, Mass.**  
Whitney, A. R. & Co., 17 B'way, N. Y.

**Wolff, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.**  
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**California Wire Works, San Francisco.**  
Hazard Mfg. Co., Wilkesbarre, Pa.  
A. Leschen & Sons Rope Co., St. Louis

**Trenton Iron Co., Trenton, N. J.**  
Washburn & Moen Mfg. Co., Worcester, Mass.

**Williamsport Wire Rope Co., Williamsport, Pa.**  
**Wire Spool.**  
Gallin & Co., Cleveland, O.

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**Wood-Working Machinery.**  
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**Sebastian, May & Co., Sidney, O.**  
Seneca Falls Mfg. Co., Seneca Falls, N. Y.

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Am. Roll Paper Co., St. Louis, Mo.

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**Billings, Spencer & Co., Hartford, Conn.**  
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Trimont Mfg. Co., Roxbury, Mass.

**Williams, J. H., Brooklyn, N. Y.**  
**Wringers.**  
Colby Wringer Co., Montpelier, Vt.

See Alphabetical Index, Page 146.

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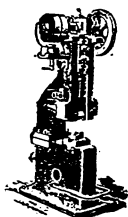
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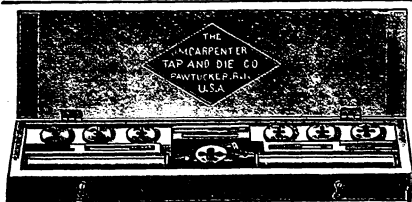
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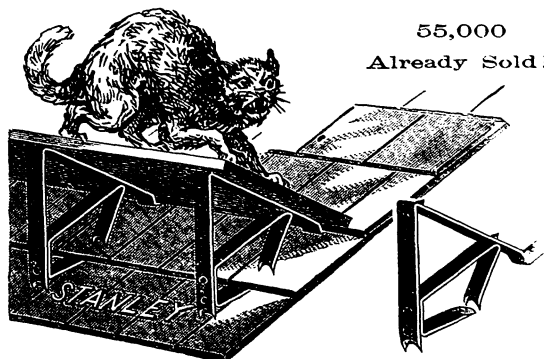
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They are used for the support of fire buckets on summer hotels; and for keeping the snow from falling off winter hotels.

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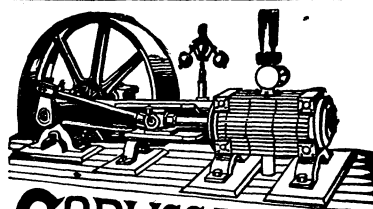
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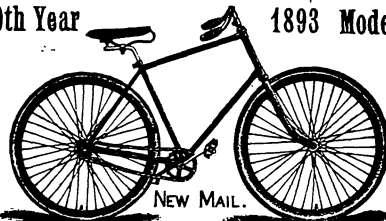
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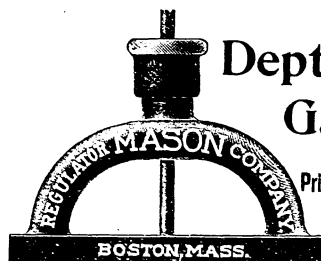
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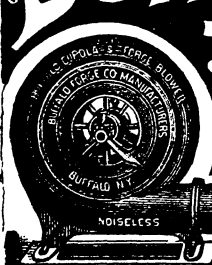
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See Advertisement, Page 1051.

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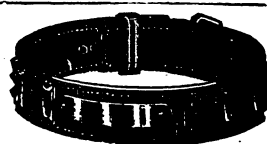
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7x2	$1$ to $1\frac{1}{2}$	4 in	64
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7x2	$1$ to $1\frac{1}{2}$	6 in	66
8x2	$1\frac{1}{4}$ to $1\frac{1}{2}$	7 in	67
8x3	$1\frac{1}{4}$ to $2\frac{1}{4}$	8 in	68
9x3	$1\frac{1}{4}$ to $2\frac{1}{4}$	10 in	69

FOR SCREEN, MEDIUM AND HEAVY DOORS.

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ARE THE BEST IN  
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# THE IRON AGE

THURSDAY, MAY 4, 1893.

## A New 62-Inch Boring and Turning Mill.

The Bridgeport Machine Tool Works, E. P. Bullard, Bridgeport, Conn., manufacture a 62-inch boring and turning mill, which is the result of eight years' experience. The capacity of the mill is 62 inches in diameter and 42 inches in height. The table is 58 inches in diameter, and is powerfully geared and has 16 changes of speed. The teeth on the table, as well as on the pinion, are accurately planed. The heads are constructed so that either one

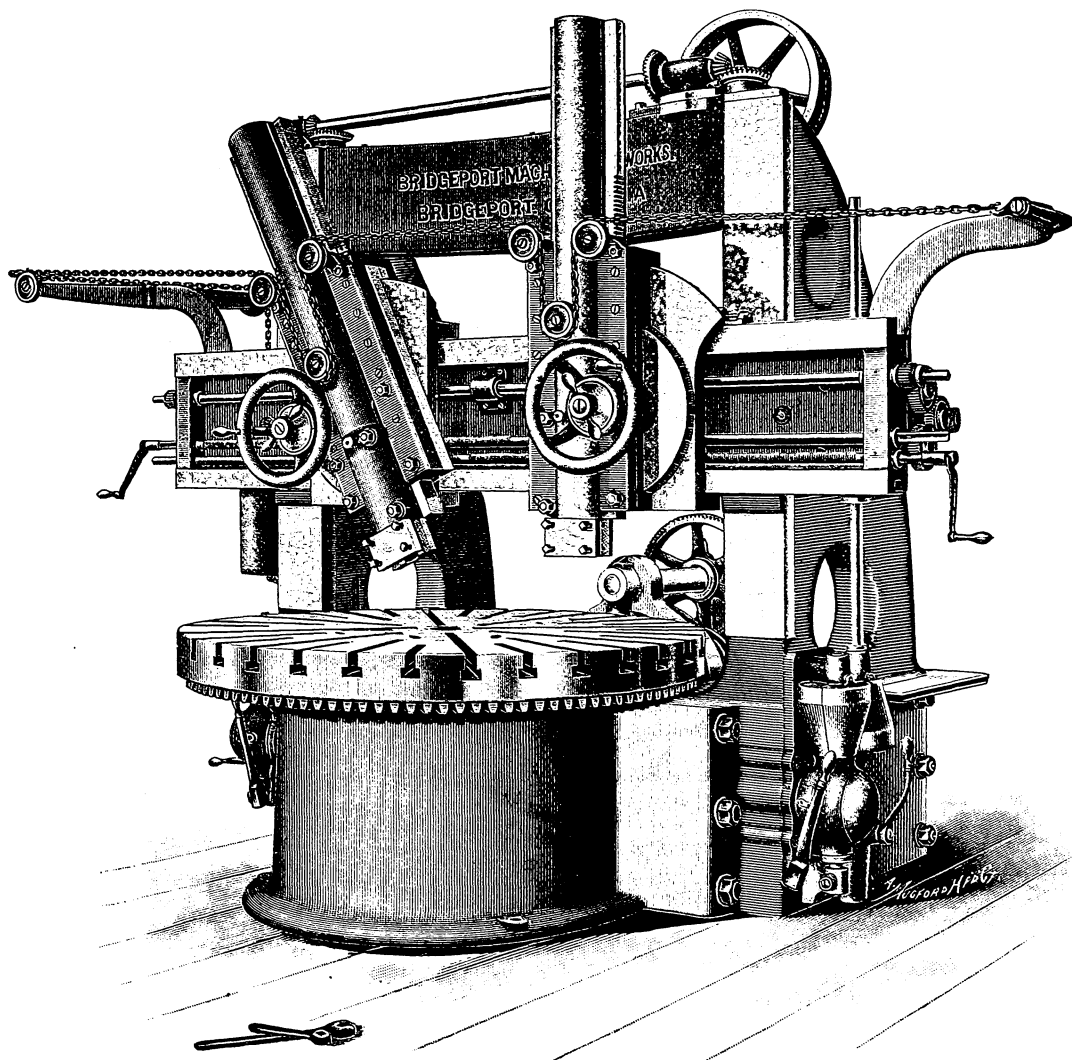
and he predicts that the railroad will become an important feeder of our markets, as the trip northward can be made quicker than from either Panama or the Bermudas.

## Chicago Ornamental Iron Works Burnt.

Many important contracts will be delayed by a fire which did \$55,000 worth of damage at the Chicago Ornamental Iron Works on the 22d ult. The original patterns for ten ornamental panels designed by Lorado Taft for the Columbus Memorial Building at State and Washington

such a conspicuous feature in the remodeling of Chicago business houses the past year or two came from these works. They are connected with the South Halsted Street Iron Works, manufacturers of architectural castings.

The combined fleet in New York harbor a week ago is computed to have exploded in their two grand salutes 120,000 pounds of powder, which at 25 cents a pound cost \$30,000. Twenty-one guns fired by the Britishh flagship "Blake" consumed 2100 pounds and the ordinary charge of powder



NEW 62-INCH BORING AND TURNING MILL.

may be brought to the center, and can be set at any angle; they carry the tool bars, which have a movement of 20 inches. Each head has an entirely independent feed in any direction. The feeds are all positive and range from  $\frac{3}{8}$  to  $\frac{1}{2}$  inch horizontally, and from  $\frac{1}{8}$  to  $\frac{1}{4}$  inch in angular and vertical directions. The cross rail is raised and lowered by power. The machine is self-contained, thus avoiding the necessity for building an expensive foundation. Its weight is 20,500 pounds.

An engineer just from the Tehuantepec Railroad, in Northern Mexico, says he has secured a plantation of 200,000 acres on the line of that thoroughfare, which will be devoted to coffee, fruit and rubber,

streets were destroyed and cannot be duplicated. Patterns for the ornamentations of the Dakota Building at the World's Fair, and for a new City Hall at Portland, Ore., were also burned.

The foundry fronted on Halsted street, occupying the numbers from 2609 to 2627, running back to an alley. The building was two stories high, the ground floor being used as a foundry, with plan and pattern rooms on the floor above. The fire started from some unknown cause, appearing simultaneously in the engine room and on the second floor.

Under the able management of P. S. Vanderkloot, this establishment has gained a prominent position in the manufacture of ornamental iron work. Many of the artistic store fronts which have been

burned by the 25-ton guns of the "Miantonomoh," the American harbor defense iron-clad, weighs 125 pounds. Another calculation made by a well-known naval officer is that the average amount of powder burned by the several ships was fully 50 pounds per gun and that at least 800 shots were fired. The artillery employed in the Napoleonic wars, where the cannonading was said to have been so terrible, used charges not exceeding 10 pounds.

Counsel for the locomotive engineers in the Ann Arbor case have determined, in the event of their failure to secure a reversal of Judge Rick's decision by the Supreme Court, to appeal to Congress to amend the Interstate Commerce act in the interest of the labor organizations.

### The New Western Electric Generator and Motor.

The recent numerous and important applications of electromotive force to purposes of power transmission on a large scale is having the effect of rapidly dispelling the skepticism of engineers and power users in regard to the latent possibilities of this medium as compared with the older systems of purely mechanical appliances. While, in the absence of any

naturally leads to continual progress in the improvement of appliances for the generation and utilization of the current, among the most recent instances of which are the new generator and motor of the Western Electric Company of Chicago and New York. The machines are being built at the Chicago works, and a 300 horse-power equipment is now being installed for use in driving the entire machinery of the company's shops, in which the difficulties of transmission by ordinary methods are exceptionally great.

which there are six sets, are of carbon and are cross connected. An essential feature of the machine is the low speed of rotation of the armature, being for this size but 255 revolutions per minute, or but from one-half to one third of the ordinary speed. This, of course, effects a great saving in power required to drive, owing to the reduction of frictional resistance. Also the wear and tear of journal bearings, commutator and brushes is correspondingly less. The commercial efficiency of the generator is 86 per cent, and, there-

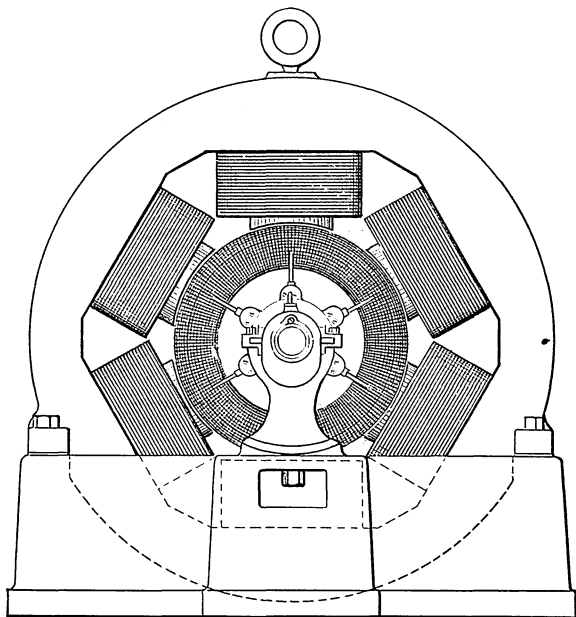


Fig. 1.—Side Elevation.

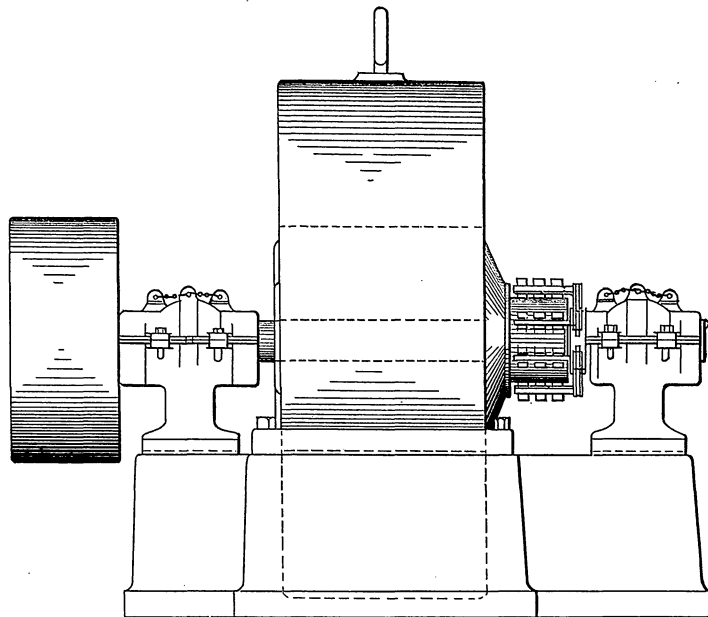


Fig. 2.—End Elevation.

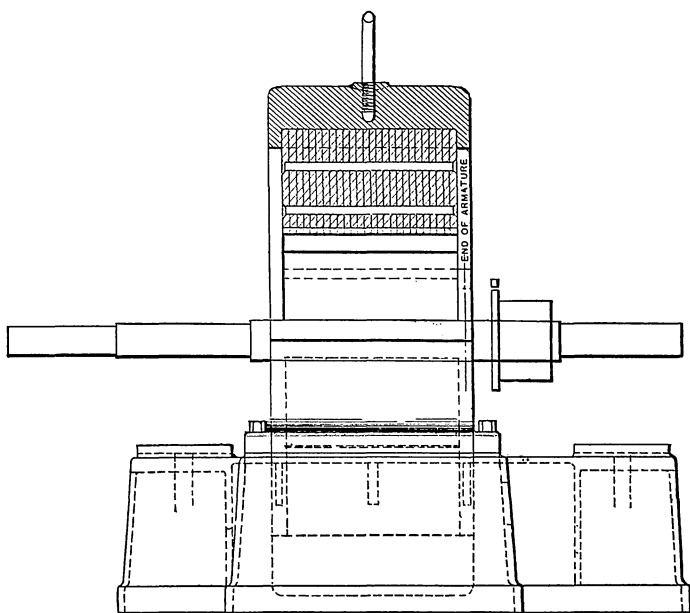


Fig. 3.—Longitudinal Section.

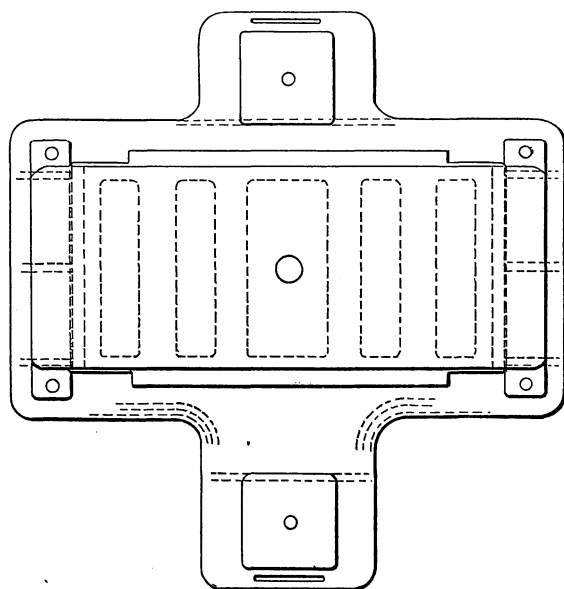


Fig. 4.—Plan.

### THE NEW WESTERN ELECTRIC GENERATOR AND MOTOR.

sufficient data on the subject, its comparative economy is still problematical, there can be no doubt as to the fact that its efficiency in many, if not all, cases has been fully demonstrated. That is, it makes "the wheels go round" in a satisfactory manner, and its easy adaptability to all conditions of location renders its application perfectly simple, even in cases which may present extreme difficulties in the use of any purely mechanical device. The development of the electrical system

In the accompanying illustrations are shown the general construction of the two machines, together with such detail drawings as refer to specific improvements.

#### The Generator.

The generator, shown in Figs. 1 to 3, is of a capacity of 150 kilowatts or electrical horse-power. It is of the multipolar gramme type, compound wound for constant potential, or may be over compounded if desired. The brushes, of

fore, the engine power required to drive one of this size is  $\frac{150}{0.86} = 174.42$ , say 175

horse-power. The machine may be driven either by direct connection with main shaft of engine, or by belt from fly wheel, as the low speed renders the interposition of counter or jack shaft unnecessary even where engine is of the low speed type. For instance, with a 10-foot fly wheel or driving pulley and a 3 foot pulley on arma-

ture shaft a speed of 76½ revolutions of engine will give the required 255 of generator, which is well within the limit of the Corliss or other release-valve type. The total weight of the generators is 90 pounds per horse-power applied, or a trifle less than 105 pounds per developed horse-power. This will make the weight of the 150 horse-power machine about 15,700 pounds.

In designing the generators care was taken to render them specially adapted for such duties as involve great range in fluctuations of load occurring rapidly and frequently, as in case of starting and stopping such machines as require a large amount of power, but which are not in continuous operation. Under the most extreme conditions of fluctuation the

all 6 feet 7½ inches. Floor space required, including overhang of pulley, is 6 feet 10 inches by 8 feet 5 inches. The drawings Figs. 3 and 4 show the general constructive features of bed plate, housing and field-magnet cores, of which no description is necessary. The armature is shown in full detail in Figs. 5, 6, 7 and 8, the principal features of which may be briefly referred to. The shaft is of machinery steel, 6 inches diameter, to which are bolted the three brass spiders A A A carrying the peripheral coils. Each of the six arms of spiders is provided with a clamp jaw, D, by which are held the longitudinal gibs C and keys B, both of brass, by means of which the necessary adjustment of periphery is effected. The two through bolts shown in each jaw serve to clamp the gibs firmly

armature coils. The line F is the face of commutator; the flanged portion E the armature connection, and G the sleeve or hub for holding the segments—120 in number—and attaching to the shaft. This is shown clearly in section in lower half of Fig. 10, all the details of construction and insulation being noted.

The quadrant, Figs. 9 and 10, needs no description, its construction being apparent at a glance. The brush holders, Figs. 10 and 11, are shown in side and end elevations, and, as will be noted, each carries a set of three independently adjusted carbons. The required pressure of the latter on the face of commutator is obtained by means of the spiral spring, whose tension is regulated by the thumb nut bearing on the curved horizontal lever.

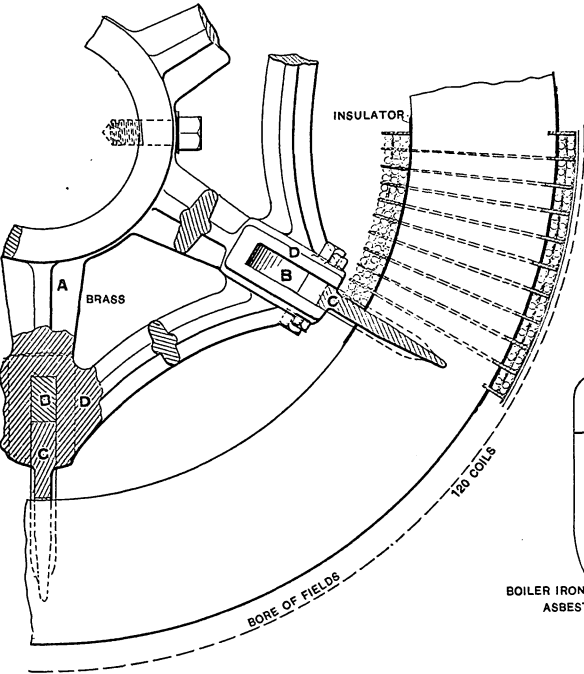


Fig. 5.—Quarter Cross Section of Armature.

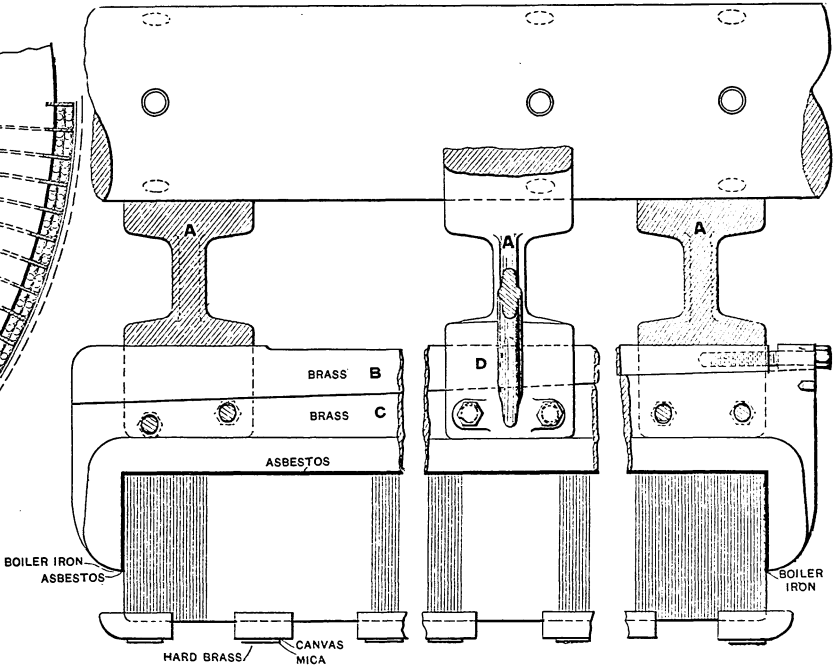


Fig. 6.—Section of Armature Parallel with Shaft.

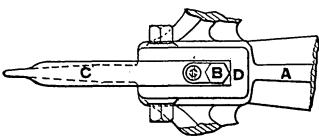


Fig. 8.

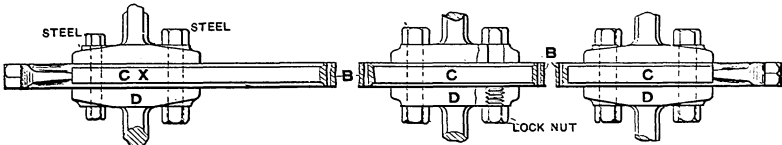


Fig. 7.—Plan of Gib and Clamps.

THE NEW WESTERN ELECTRIC GENERATOR AND MOTOR.

regulation is perfectly automatic and so close as to require absolutely no attention to maintain the necessary uniformity of speed and current. For example, a wood-planing machine or large emery grinder requiring, say, 15 horse-power, or 10 per cent. of the full power of generator, may be started and stopped as quickly as possible without affecting the speed of either the generator itself or of the other motors connected with the system.

The journal bearings of the armature are provided with oil reservoirs and a simple and efficient feeding device, by which the lubrication is made automatic and perfectly reliable, there being a glass gauge to show the quantity of oil in reservoir without the necessity for close inspection.

As shown in Figs. 1 and 2, the machine is of compact and symmetrical design. The bed plate is of deep cored section (24 inches) giving ample strength and stiffness. The dimensions on plan are 6 feet 10 inches by 7 feet 1 inch, and height over

in the adjusted position, while that shown passing through lug in end of gib and tapped into small end of key holds the latter in place.

The arrangement of winding of the coils is shown in section in Fig. 5, one half of one of the six segments being given in detail. There are in all 120 coils of six wires each, laid in the outer face in two courses of three, and in the inner face in three courses of two each. The method and material for providing the necessary insulation are noted in plan in Figs. 5 and 6, the several substances employed being cotton canvas and drilling, mica, vulcanized fiber and asbestos, each being selected according to its peculiar adaptability to the requirements of its location.

In Figs. 9, 10 and 11 the commutator quadrant and brush holders are shown. The partial transverse section of the commutator, in Fig. 9, shows the arrangement of segments, their insulation, and the method of connecting the wires from the

This arrangement gives a very elastic pressure, and admits of quick and easy adjustment of any one of the 18 brushes forming the set. The main conductor attachments are made by means of the set-screw sockets.

The journal boxes are self-adjusting, of the ball bearing type, and, as previously mentioned, are self lubricating. The construction is shown in Figs. 12 and 13, and with the exception of a brief reference to the oiling device needs no description. It will be noted that two rings hang loosely on the journal, in positions to divide the length into equal spaces on either side of each. A sufficient portion of the upper part of the box is cut away to enable the ring to clear it while suspended on the journal. The lower side of this ring is immersed in the oil contained in the reservoirs, and as the journal revolves, the ring, by reason of its greater diameter, travels more slowly, and constantly changes the point of contact, at the same





are acquainted with the transportation needs of that section. The idea is to start from a point near Kinzie street and reach the city limits and make a connection with the north shore electric lines. We shall cross the river either by bridge or tunnel, and pass to the South Side elevated and the other roads which are in process of construction. The endeavor will be to form a connection with them, but our charter will give us the right to parallel the South Side system. There is a rich territory between the boulevards in the southern part of the city which may be reached. I do not say that we shall parallel these and other systems. We hope to make connections with them. No route has been surveyed on the North Side or elsewhere, but several have been examined."

Another scheme is that of the North Chicago Rapid Transit Company, for which a license to incorporate was issued on the 22d ult. The incorporators are William Loeb, Abraham Gottlieb and

of the city, and is known as the Midland. Application was once made to the City Council for a franchise, which was granted and then vetoed by the Mayor, but is again being pressed. The territory proposed to be covered by this company is very extensive, but the scheme is regarded with suspicion, as the promoters will not disclose the names of their principals.

An English military officer, Mr. Baden Powell of the Scots Guards, has devised an ingenious method of signaling by night with the aid of a paper fire balloon of 6 or 8 feet diameter. When it is desired to send a message, some beads made of a brilliant quick-burning composition are strung on a piece of quick-match, leaving intervals, and using large and small beads to make the corresponding flashes. The balloon is inflated by burning spirit, or even straw or wood. The message string is then suspended below it, a time fuse attached, and the balloon being sent up,

## THE WORLD'S FAIR.

### The Actual Condition of the Exposition.

For the benefit of our readers who may be contemplating an early visit to the World's Fair at Chicago we have caused a thorough investigation to be made of the exact status of the work of preparation. This has been done by our own representatives, who have been uninfluenced in any way and have only sought to secure actual facts. There is no question that the Chicago exposition will far surpass, both in magnitude and splendor, any of the international expositions thus far held. It will, therefore, be unfortunate if a very large number of persons from distant sections of the country should visit it too early, and finding it in an incomplete condition should represent it to their friends and neighbors as disappointingly crude. The managers of the exposition have been obliged to contend with the most formidable obstacles and to overcome the most forbidding conditions from the very inception of the enterprise, not the least of which has been the very unfavorable weather of the entire month preceding the opening day. This is the period in which the grand work of two years should have come to a successful climax, the culminating point being completed buildings, completed exhibits and completed grounds. That they have been disappointed in accomplishing the work in the time specified is not to their discredit, and reproaches do not lie against them. They have done nobly, but they could not accomplish the impossible. No previous international exposition had opened its doors with every nail driven, every display in place, grounds in perfect order and contractors out of a job, hence Chicago could not reasonably expect a different order of things to prevail. Exhibitors will fail to ship their goods in ample season for installation, and a thousand little delays aggregate a formidable mass of confusion at the wind-up.

Chicago push is proverbial, but even Chicago push cannot prevail in a contest with the rest of the world and the elements combined. The preparations for the exposition are not complete in many respects, and it is only just to our readers that we should say so. While visitors even now will see much that is interesting and instructive, if they would get the full benefit of the elaborate preparations to be made for their entertainment they should wait until May has pretty well run its course. Details of the condition of the buildings and grounds the latter part of last week are as follows:

#### Department of Machinery.

In the Palace of Mechanic Arts the situation is unequivocally one of incompleteness. As regards the building and its several annexes there is much still to be done in the way of finishing up, though the strictly constructive portion of the work has been completed for some time. But experience teaches that this final finishing up process consumes, almost invariably, more time than was originally allowed for the purpose, and these buildings are no exception to the rule. The mere matter of clearing away debris, sweeping and furbishing, to place the whole in presentable shape for the inspection of visitors, is a work of days. Exterior painting, decorating and repairing of staff work damaged by the weather and the constant procession of teams to and from the interior, will require at least a week, though at the present tardy rate of operations it must spin out much longer, and until it is finished the unsightly scaffolding must remain. The grounds immediately surrounding the buildings are in a chaotic state of litter from the piles of

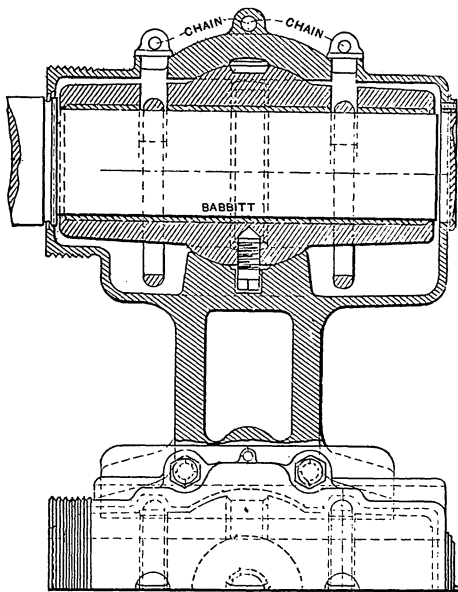


Fig. 12.—Longitudinal Section.

*Self-Oiling Bearing.*

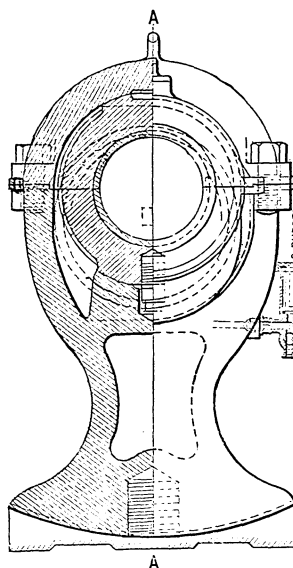


Fig. 13.—Cross Section.

### THE NEW WESTERN ELECTRIC GENERATOR AND MOTOR.

George W. Claussenius. The first named is a banker and the second is a well-known civil engineer and bridge builder. They contemplate an enterprise also on the North Side of the city, which is but imperfectly supplied with transportation facilities. Their application for a charter reads:

"For the construction, maintenance and operation of an elevated railway, with all the necessary and convenient tracks, benches, stations and other appurtenances, and the acquisition of the necessary land, property, franchises, rights of way and privileges; the railway and other improvements are to be located wholly within the limits of Cook County and the road is to be operated by steam, electricity or other practical motor power; the road is to extend from the convenient terminus at or near a point north of the north line of Washington street, thence northerly across the Chicago River, over a bridge or through a tunnel to be constructed by the company, thence northerly to the city limits, with branches off of and connecting with the main line, running north-westerly to the city limits."

The capital stock of this company is placed at \$10,000,000.

A third scheme contemplates the erection of an elevated system on the West Side

the message is flashed forth. The apparatus is described as very portable; one man can easily carry it, and with it not only can one preconcerted message be flashed, but a few words can be sent up at one time, and those can be answered from a similar balloon from another part, upon which other balloons can be employed to continue the signaling.

An eminent English civil engineer has recently observed that we often hear of a speed of 90 or 100 miles being reached by English railway locomotives, but for 25 years he has ridden upon many engines and traveled on the fastest trains upon all the railways in Great Britain for the special purpose of ascertaining their rate of speed. Upon a few occasions, and under favorable circumstances, he has recorded the very high speed of 79.9 miles an hour, but he states that he has never been able to time a train or engine at as much as 80 miles an hour.

Three weeks ago the first railroad in the Indo-Chinese Peninsula was opened for traffic. The King of Siam performed the opening ceremony. The road is expected to open up vast resources of teak, ebony, sandalwood and other valuable products.

gravel, old lumber and unused building materials, and on the south and east sides the ground is ankle deep in loose sand still to be graded and paved, and upon which the work has been entirely discontinued for some time past. In the interior, the lobbies, galleries and offices may be considered in as good condition as is possible, until the entire installation of exhibits is completed and the final cleaning up can be done.

The condition of the main floor is necessarily an uncertain quantity and must so continue until all machines are in place on their foundations, and all pipe and belt holes provided. Three of the original railroad tracks—situated about 4 feet below the floor level—are still uncovered for a distance of several hundred feet from the west end of building and cannot be floored over so long as delayed exhibits continue to arrive. This, judging from the large amount of totally unoccupied space allotted to exhibitors, will not be completed for an indefinite time, unless the exposition authorities shall fix or enforce the limit for their admission. While there can be no doubt as to the justice of such action its effects might be disastrous and result in many extensive gaps, seriously interrupting the continuity of the display and the wasting of valuable space which would have been taken gladly by other manufacturers who were desirous of making extensive exhibits. Judging from present appearances the condition of affairs in this department will require some very energetic work for several weeks to come in order to complete the installation of exhibits and the subsequent general finishing touches necessary to a creditable display.

Outside of the power and electric plant and a few other conspicuous exceptions, it is no exaggeration to say that the buildings are in a chaotic state, which would admit of but little satisfaction to pay for the difficulties of an attempt at a general inspection of exhibits. So far as this department is concerned it will certainly be a great mistake for those who can devote but a limited amount of time to the exposition to make their visit earlier than the latter part of June. The display, when completed, will be most magnificent and well worthy of the attention of all who may have the opportunity of visiting the fair, but it should be seen in its normal condition and not during the transition period.

Referring briefly to some of the more important details, the condition of the power plant may be shown in connection with such application of the power as are nearly or entirely direct. The battery of boilers in main fire-room annex, together with their feed pumps and the entire system of steam, feed water, blow off and fuel oil piping, may be regarded as complete, and in two or three days at most, when the paving of floor and the non-conductor pipe coverings are finished, the steam department may be seen at its best. West of main fire room, in a similar annex, there are several other boilers in course of erection, which will probably not be ready for inspection under a couple of weeks. An immense steam main, located in cellar under floor near south wall of Machinery Hall, connects with all of the boilers, and from this the distribution to the different engines is being made as rapidly as possible, although in many instances the work on some of the most important engines is at a standstill while waiting for the Exhibition Company to give them their steam connections. As the entire system of piping for all purposes is beneath the floor, and the space in the cellar is much obstructed by foundations, posts, &c., the work is unavoidably slow, and, although pushed with the utmost rapidity possible, considerable time must elapse before all connections with steam ma-

chinery are made and subsequent work on the latter completed.

With the exception of a few isolated engines of comparatively small powers, the entire power plant is located in the space south of the south aisle, extending almost the entire length of the Main Building and annex, a distance of over 1000 feet. Beginning at the east end the Worthington circulating and fire pumps have been fully ready for service for a month or more and all debris is removed so that this exhibit is entirely completed. The General Electric Company's vertical triple expansion condensing engine, with its two direct connected multipolar 500 K. W. generators, will require fully a week for completion, though the work is pushed day and night. Near to it are two 150 K. W. Edison generators, completed and set, but not yet connected nor belted. There are two more of these machines on the floor not yet on foundations. The four machines are to be driven by one 480 horse-power Ball cross compound and one Armington & Sims high-speed simple expansion engine of 400 horse-power. Both engines will require several days' work to place them in order for continuous service. In next space are four Eddy power generators of 200 K. W. each, to be run from one single cylinder 250 horse-power Phoenix engine, one tandem compound of same power and one triple expansion cross compound of 500 horse-power. Both engines and generators will require several days' work to fit them for service. In same space is a 500 horse-power triple expansion cross compound Allis engine, upon the crank shaft of which will be placed the armature of a 500 K. W. Westinghouse railway generator. The work on this machine is apparently discontinued, although certainly not more than half done, and will require a couple of weeks to put it in running order. Next space contains four Matner power generators, driven by two Woodbury tandem compound engines of 375 and 600 horse-power; also four "C & C" power generators of 100 K. W., each driven by one tandem compound A. L. Ide engine of 225 horse power and one single cylinder high speed of same make 200 horse-power. This group is ready for service, having already been in operation. A large plant of 16 Brush dynamos for 60 arc lights each, driven by five Ball & Wood engines, aggregating 750 horse-power, has been in use for about two months on lighting service. They are ready for operation immediately.

The Fraser & Chalmers 1000 horse-power triple expansion cross compound engine, for driving one of the 10,000 light Westinghouse incandescent dynamos, will probably be completed within one week. The dynamo has been ready for the belt for some time past; but as the latter is of 72 inches width, it will require several days' work to get it in place after the engine is ready. North of this exhibit, in same space, is the 2000 horse-power quadruple expansion engine of the Edw. P. Allis Company, which is completed, as are also the two 10,000 light Westinghouse dynamos which it is to drive. As there are two 72-inch leather belts required, one of which will run on top of the other, considerable time will be necessary for putting them on the pulleys. West of the 1000 horse-power engine are three Westinghouse automatic engines of 330 horse-power, each driving a Westinghouse exciter. These are apparently ready for immediate service. Between the two large engines are located two plants which have been in continuous service for several months past. They are two "C. & C." 100 K. W. power generators driven by a McEwen tandem compound engine of 220 horse-power, and two exciters and Westinghouse automatic engines of 330 horse-power each. The next in order are four 1000 horse-power Westinghouse engines of the vertical tandem compound

type, to be directly connected, each to a 10,000-light Westinghouse dynamo. The latter machines have been ready for some days; but, although the engines are not yet connected to the dynamos, and have fully a week's work on each to place them in running order, there is little if any work being done on them.

In the next space are three dynamos of same size and make, driven respectively by a 1000 horse-power Buckeye triple expansion cross-compound engine, a 1000 horse-power Atlas double tandem compound, and a 1000 horse-power McIntosh & Seymour double tandem compound. These engines are all delayed for want of steam connections, for which they have been waiting for a week or more. There will be fully a week's work to complete them after these connections are made. The dynamos are about ready for the 72-inch bel.s. Following are two more of the same dynamos, each with its 1000 horse-power Westinghouse vertical-compound engine. These machines are far behind the others, and will certainly require a couple of weeks for completion, if pushed as rapidly as possible. The next space contains 14 Fort Wayne 60 light arc dynamos, driven by 5 Buckeye engines, as follows: One cross-compound condensing 300 horse-power, one single cylinder 125 horse-power, one single cylinder high speed of 125 horse-power, one single cylinder girder frame of 190 horse-power, and one tandem-compound of 150 horse-power. These engines and dynamos, with the necessary switch boards, &c., are ready for immediate service. West of this group are 20 Standard 50 light arc dynamos, belted from line shaft under floor. The latter is driven by 1 Erie City single cylinder high-speed, 1 Russell & Co. double tandem compound of 500 horse power, and another of same type of 200 horse power. These machines are ready for use. The next space contains 4 Norwalk air compressors, all of which have been for some time in use, and are now being overhauled for company appearance.

The next space is first in the annex. In it and the following one are two groups of Thomson-Houston 50-light arc dynamos. The first is composed of 16 machines, driven, through line shaft, from one Lane & Bodley cross compound 300 horse-power, one tandem compound 300 horse-power, and one single cylinder 200 horse-power, same make—all Corliss type. The second group of 10 dynamos receives power from one 500 horse power Atlas tandem compound, driving through line shaft. These machines are ready, except for the matter of clearing up the spaces occupied. Beside the latter group is one of six Excelsior 50-light arc machines, driven by a 225 horse power Boss cross compound, all of which are nearly ready for service. The last space in Main Building is occupied by two Ingersoll & Sargent duplex air compressors, the engines of which are of the Corliss type, cross compound. The work will require fully two weeks for completion. The last space occupied by power plant contains 10 Western Electric Company's 50-light arc dynamos, driven by one Watertown double tandem compound of 250 horse power, and two Skinner single cylinder 150 horse-power engines. This exhibit is far from complete. Of the isolated engines throughout the building there are but few which will require any considerable time for completion. Most of these are to be used for driving the line shafting. The latter is far from complete, and will hardly be in condition for receiving power inside a week or 10 days.

The paper-making plant to be installed at southwest corner of annex must be taken on faith, as, with the exception of some large tanks and drums, there is little of the material to be seen. The machine tool and wood-working machinery exhibits, with a few exceptions, are not even

placed in position. The pumping machinery, for which the large hydraulic basin has been provided, appears to be conspicuous principally by its absence, as but few are yet visible. On the north side of the building, for nearly the entire length, the space is almost impassable by reason of the pavilions, platforms and inclosures in course of construction; while most of the exhibits are still in their boxes, or but barely unpacked. There does not appear to be any sign of anxiety expressed in the leisurely manner in which the work of installation is progressing—both foreigners and natives seeming to take matters quite coolly. In the pumping station the Worthington high duty horizontal duplex engine is ready for continuous service; as are also the two vertical engines, with the exception of some trifling adjustments. The high speed triple expansion horizontal engine has not yet arrived, and will require a couple of weeks at least for erecting after it is received. The finishing up of work in the building will require about a week or ten days, and the grading and paving of the grounds surrounding it about the same time.

#### The Transportation Building.

The Transportation Building, which is one of the very large buildings of the fair, and is intended to present a display of exhibits which will be attractive, not only to those interested in methods of transportation, but to the masses generally, is in comparatively good shape. The inclosures of the different exhibitors are well completed, and exhibits are mainly in such shape that a very few days will enable them to be put in proper order. The opening day may not have seen everything in trim, but not many days will elapse until this building needs no further touches to make it complete. The full-size model of the great steam hammer of the Bethlehem Iron Company looms up in the center of this building completely finished. Around it are a great variety of displays of all kinds of exhibits covering both land and water transportation. The annexes are full of locomotives and all kinds of passenger and freight cars, from the earliest type down to the most finished constructions of this modern era. The visitor to the Transportation Building will be repaid in a very short time for the trouble taken to see its exhibits.

Outside of this building the roadways are not inviting; some of them are in very bad condition, having been cut up by heavy traffic teams. It would seem as though a week or two of good weather and a great deal of very hard work would be necessary to make them presentable and insure visitors against wading through mud or suffering from clouds of dust. And yet it is remarkable how quickly work of this character can be done with the energy shown by the management. Passing to the north entrance in the Mines and Mining Building in the morning a great waste of rough roadway was crossed, which in the afternoon was found to be covered by a smooth sheet of asphalt which had been placed in position and smoothly rolled during the short intervening period. Looking at such achievements it is not safe to indulge in unfavorable predictions as to length of time necessary to get the roadways in good shape.

#### Administration Building and Terminal Station.

The Administration Building is practically completed. This is the show building of the group, having been planned on a more elaborate scale of ornamentation and for a greater display of architectural effect than any of the others. Such slight finishing touches were being added last week as were of no special moment, but more in the nature of house cleaning and brightening up. The great

dome which covers the interior of this building, starting from the ground floor, is finished and excites the admiration of all who see it when they gaze upward and examine the magnificent fresco work.

The Terminal Station within the grounds, intended for the accommodation of excursion trains on any of the railroads running into Chicago, is located a short distance east of the Administration Building. It is completed and ready for the accommodation of World's Fair traffic. Between this building and the Administration Building is a broad plaza which will be macadamized, the work now being well under way. So quickly is this done by a very large force of men who have all the necessary appliances for rapid work, including heavy steam rollers, that large sections are completed in hours instead of days, as is usually the case. One of the worst pieces of roadway in the grounds is that which extends north of the Administration Building between it and the Mines and Mining Building. This looks as if it would not be presentable until after all the heavy hauling ceases and several days can be taken for its complete reconstruction. This space is rendered the more uninviting by the erection of some pavilions for various purposes, which are as yet uncovered with staff and consequently present a forlorn appearance.

#### Mines and Mining.

In the Mines and Mining Building quite a number of exhibits were finished and ready for inspection last week. Among these may be mentioned that of Stumm Bros., the comprehensive display of New South Wales, the exhibits of the Cambria Iron Company, the Solid Steel Company, Wm. Jessop & Sons, the Gates Iron Works and the States of Missouri and Minnesota. The exhibit of Stumm Bros., who are prominent German manufacturers, was described to some extent in these columns about a month since. It occupies a very conspicuous position, and is all the more conspicuous by reason of the non-completed state of the exhibits surrounding it. The Cambria Iron Company make a very creditable display of their products, a prominent position being given among them to the original Kelley converter. Chief Skiff has pushed the work of installation in this building with unceasing vigor, but despite his utmost exertions the building will not be in good shape for certainly two or three weeks. Some of the exhibitors have but recently begun to erect their pavilions, and the aisles were blocked by packages of goods, which could not be put in place until after the pavilions were ready to receive them. The cabinets in the galleries intended for mineral specimens were only partially completed last week, and the work of unpacking, placing and arranging the specimens will certainly take days, if not weeks of time. It is likely that everything will be in good shape here at an earlier day than is at present deemed possible, because in every direction work is being prosecuted with energy and everybody is evidently hurrying to make up for lost time.

#### The Main Building.

The great building devoted to Manufactures and Liberal Arts was last week a scene of almost indescribable confusion. Everywhere there were crowds of workmen bustling and hurrying, who were attacking huge piles of merchandise, packing boxes and all sorts of building material, trying to get matters into good shape, but making such slow progress that a day seemed to count for very little in getting things in good condition. Piles of lumber obstructed the aisles, innumerable pavilions were only in the early stages of construction, and in very few parts of the building could an idea be obtained as to

the character of the exhibits to be made in that particular section. Some of the exhibitors have their pavilions and exhibits in perfect shape. Conspicuous among these are the English, German, French and Belgian sections. Our own people seem to be the most dilatory. Exhibits from Chicago houses were only arriving the latter part of the week, the people nearest the fair apparently having delayed their work the longest. The Russian pavilion, however, has just been begun. The section devoted to stoves and house furnishing goods would have been difficult to find had it not been for the huge pavilion of the Michigan Stove Company, built in the form of a cooking stove, standing 25 feet high and 30 feet long, which makes a striking landmark in the general chaos. The visitor who enters this building this week and expects to see a complete collection of exhibits will be very much disappointed. Two weeks at the very earliest will be required, and perhaps more time than that will be necessary from present appearances.

#### The Agricultural Building.

The Agricultural Building, which is another of the great buildings of the fair, presents a mere promise of what the display in it will be. Exhibitors were actively at work on their pavilions, but while some of these were completed and in full readiness for the opening day, others were comparatively unfinished and numbers of them had just been begun. Packing boxes filled up the aisles and in many cases were piled so high as to cut off the vision over a great part of the area. A month would seem to be none too much for the proper arrangement of exhibits in this building.

#### The Electricity Building.

In the Electricity Building, in which there are comparatively few exhibitors, who were therefore expected to get their exhibits in good shape at a very early day, much still remains to be done and the display could by no means be considered nearly ready. Packing boxes were as conspicuous here as in the other buildings, and days, if not a week or two, would be needed to enable the exhibitors here to get everything in presentable shape.

#### Other Buildings.

A ramble among the various buildings located in the north end of the grounds shows that much work yet remains to be done before they will be in a finished condition. The external staff work of Horticultural Hall plainly shows the effect of last winter's storms. In some places below the window belt the staff is broken away and must be replaced. Workmen are engaged on the exterior of the building making repairs. The staff is streaked with dirt and requires painting. The floral display in the rotunda is partly finished, workmen being yet engaged in placing plants and decorations. There are few exhibits in the galleries, as workmen are finishing the decorations. In the southeast part of the building the floral exhibit is about completed, while in other parts very little has been done at installation.

The Public Comfort Building is in an unfinished condition. The walls are only partly covered with staff, while floors are being laid and partitions planned.

Puck Building shows a finished exterior. Printing presses are in position on main floor, but no exhibits are in the gallery. The staging is yet up for decorating the interior. The exterior of the Woman's Building presents a fair appearance, as do the surrounding grounds. An inspection of the interior shows that few of the booths are finished, and hardly any exhibits are in position in the Main Building, booths, or gallery.

While the Illinois Building is finished, few exhibits or decorations are in position. The grounds about this building are being improved. The exterior of the Indiana Building is being finished, and the same can be said of the interior and grounds. Old Point Comfort Building presents an unfinished condition, the scaffolding yet being up and men at work finishing the exterior. The roof of California Building is being finished. There are a few exhibits in the gallery, but none on the main floor. The grounds about this building are in an unfinished condition. The Wisconsin Building and grounds are completed. The interior of the building is finely finished in hardwood, but not furnished. Colorado presents a finished building, but not furnished. The grounds are being put in shape. The Michigan Building is in good condition and finished. The interior is not furnished. The Washington building is finished and ready for furnishing. The South Dakota Building is finished, and the grounds are being put in order. Minnesota presents a finished building, the interior being furnished and the grounds in order. The exterior and interior of the Louisiana Building are finished, but not furnished; a force of men is at work on the surrounding grounds. The exterior of the Missouri Building is being painted, as is the interior. The grounds are in an unfinished condition. Pennsylvania presents a finished building and grounds. The New York Building is in an unfinished condition, as are the grounds. The staff work shows the effects of the weather and requires painting. The exterior and interior of the Massachusetts Building are in good shape, while the grounds are unfinished. The Vermont and Maine Buildings and surrounding grounds are in an unfinished condition. The exterior of the Ohio Building is being painted. The interior is finished and ready for furnishing. The grounds are in an unfinished condition. The exterior of the New Hampshire Building is finished and the interior partly so, but the grounds are unfinished.

The Connecticut, New Jersey, Maryland and Kansas buildings and grounds are finished, and the buildings ready for furnishing. The Iowa Building is finished externally and the interior about finished. The decorations in the main room are about completed, but the grounds are unfinished. The Rhode Island, Delaware, Virginia, Montana, Utah and West Virginia buildings are finished ready for furnishing, but the grounds are not improved. The Idaho Building, which is built of stone and logs, is about half completed. The exterior of the Oklahoma Building is finished, interior partly so, but no improvements have been made to the grounds. Florida presents a building the exterior of which is finished, the interior partly so, while the grounds are mostly finished and ornamented with tropical plants. The Arkansas, North Dakota, Nebraska and Kentucky buildings are finished externally and interiors being finished. The grounds are unimproved. The staff work of the Texas Building is being completed, while the interior and grounds are in an unfinished condition.

The exterior of the Art Galleries shows the effect of the weather, as the staff work is discolored, although workmen are engaged in making repairs. A coat of paint is required to make the buildings presentable. The entrances to the buildings are in an unfinished condition, as are the surrounding grounds. An inspection of the interior shows workmen engaged in decorating walls and installation of exhibits. Among the countries most advanced in installation are the United States, Germany, Great Britain, Netherlands and Austria.

The staff work of the Fisheries Building is badly discolored, and anything but white. Grounds are in a fair condition. Only part of the exhibits are in place in

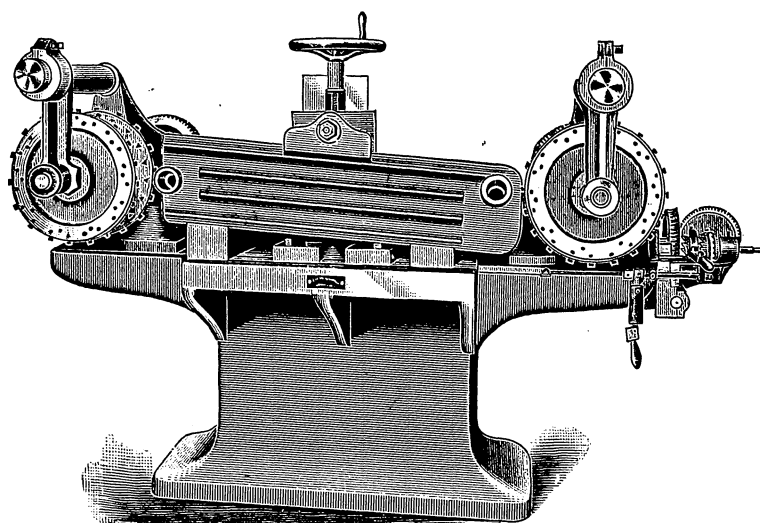
the Main Building, and the same can be said of the west wing. In the east wing the aquaria are in place and the entire exhibit about completed.

The exterior walls of the Government Building are being painted and will present a handsome appearance when finished. The exhibit in this building is practically finished in most departments. The complete arrangement of the different Government departments with their independence of any outside force has enabled them to go ahead with their installation regardless of other exhibits, hence their advanced condition. In the National Museum Department most of the exhibits are in position, and the ceiling is gayly decorated with numerous flags. In the Departments of Justice and State pictures are in position on the walls and cases are partly filled. The Department of Agriculture is only partly finished, many packing cases being on the floor to be opened. In the Fisheries pictures are hung on the walls, and about two-thirds of the cases are filled with exhibits. In the Patent Office Department the cases are filled with exhibits and a good showing is made. The Geological Survey relief maps are in position and the cases are well filled with specimens and instruments. The Bureau of Education cases are filled with models of school desks, and the shelves with books. Photographs, examples of school work and plans of school houses are all in position.

are about finished, but no exhibits are in place or improvements made to grounds. The New South Wales Building is finished, but no exhibits are in place and the grounds are unimproved. Victoria House is finished but the grounds are not. The same can be said of the Canadian Pavilion. The East India Pavilion has the staff work partly finished and the interior the same. Some exhibits are in place and the grounds are unimproved. The exterior and interior of the Swedish Building are being finished, but the grounds are unimproved. The framework of the Venezuela Building is up and being covered with staff. The Turkish Building has the exterior finished and the interior partly so. Some exhibits are being placed in position. The grounds are unimproved. While the exterior of the Brazilian Building is being covered with staff, little work has been done to the interior. The exterior of the Guatemala Building is being covered with staff, also the inner court. The frame work of the Colombia Building is up and the staff work just commenced. The Costa Rica Building is about finished, but no exhibits are in the cases and the grounds are unfinished.

#### The Superior Duplex Milling Machine.

The Superior Machine Company of Cleveland, Ohio, recently placed on the



THE SUPERIOR DUPLEX MILLING MACHINE.

The large globe is not finished. In the Post Office Department is found the World's Fair Post Office, which is in running order; also a model postal car. While many cases are filled with exhibits, much remains to be done. In the Coast and Geodetic Survey very little has been done toward the installation of exhibits. Numerous cases are filled with Smithsonian specimens, yet much remains to be done. In the rotunda of the building the large redwood tree is in position and the decorations are completed. The staging is being removed. On the east side of the building a number of large guns are in position.

The staff work of the French Colony Building is nearly finished and some work is being done to the interior, while the grounds are unfinished. The Ceylon Building is not yet inclosed, although much fine building material is on hand. The north half of the German Building is being finished and decorated and the interior exhibits are being placed in position. The other part of the building is unfinished. No improvements have been made to the grounds. The Haytian Building is well advanced, as the exterior and interior

market the duplex milling machine here illustrated, which is intended for milling cast-iron radiator sections quickly and accurately. It is so constructed that both ends of the sections are milled at the same time, the joints being smooth and perfectly parallel with each other. The two carriages have patented automatic feed and quick return to the starting point, where they stop until the operator is ready for the next section. The fixture for holding the sections is very rigid and simple in construction, so that they can be rapidly and easily changed.

The machine will mill sections from 14 to 39 inches in length and 4 to 12 inches in width. The cutter spindles have a bearing 15 inches long, are driven by worm and worm wheel, and are supported on the outer end by sleeve and bar  $4\frac{1}{2}$  inches in diameter.

The cutter heads are so constructed that steel for the cutters can be used directly from the bar without requiring any fitting.

The famous onyx quarries in the Mexican State of Oaxaca are attracting many investors from the United States.



### The Bowsher Balancing Way.

This tool consists of a frame or bed, with two planed ways, on which are mounted two standards. One of these standards is fixed, and the other is movable, the same as the tail block of a lathe. The top edges of the standards are chilled and ground true and form the "ways" on which the work is rested while being tested for "balance."

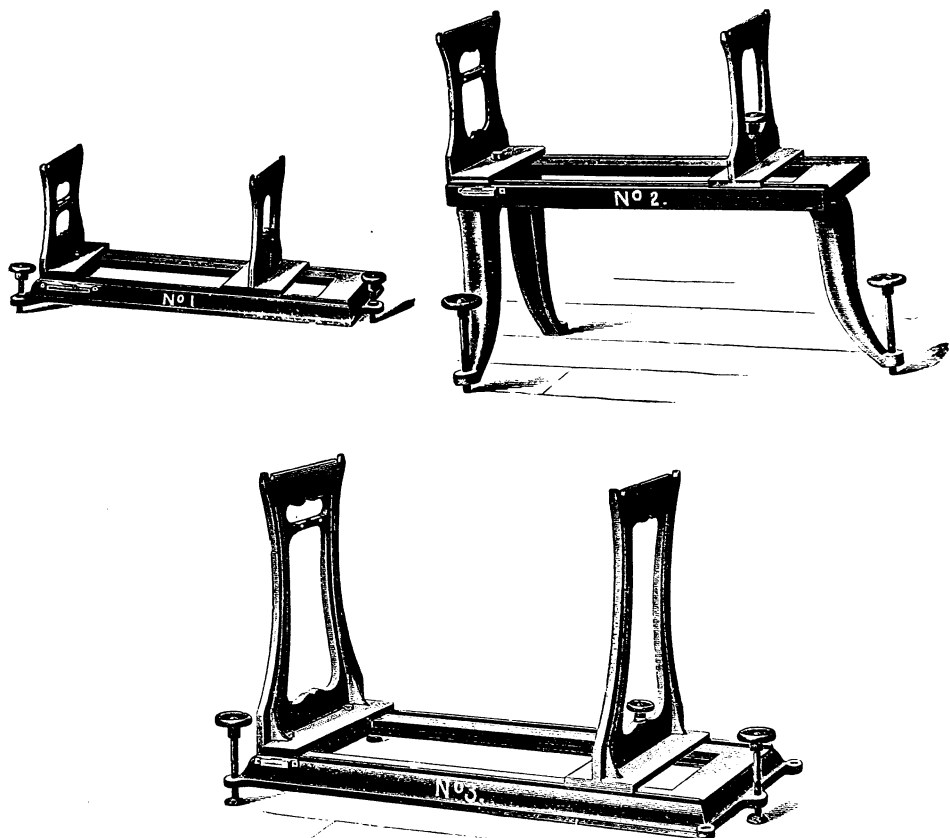
The frame is supported by three legs or feet, consequently always stands firmly. One leg or foot is fixed, and a little longer than the other two, which are adjustable by means of the screws shown. A spirit level is secured to the fixed standard, and also one to the frame, so that both lateral and cross levels can be accurately determined. The way is used in balancing

like that granted to the Dominion Company, in the first instance, and there is promise that hereafter there will be no lack of harbor and railway facilities for the development of a large trade.

### The Frank-Kneeland Machine Company

In October, 1892, the Frank-Kneeland Machine Company were organized at Pittsburgh, with a capital stock of \$150,000, for the purpose of engaging in the manufacture of iron and steel works machinery. A site of land at Fifty-fourth street and the A. V. R. R. was purchased, the ground having a frontage of 440 feet on the A. V. R. R., and extending back 600 feet to the Allegheny River. Contracts for the erection of the buildings were awarded to Riter & Conley of Pittsburgh, and these,

lathes built by the firm from their own designs. The pattern shop is located in the gallery of the machine shop, and is of ample size and equipped with a full complement of wood-working tools. The foundry is located immediately in the rear of the machine shop, and is about 25 feet distant from that building. It is also 100 feet square in size, built of brick and iron, and in equipment and general arrangement is a model foundry in every respect. It is equipped with a 20-ton Shaw electric traveling crane with 57-foot span and 30 foot lift. There is also an 8 ton hand traveling crane; a 48 inch Whiting cupola, furnished by the Detroit Foundry Equipment Company, Detroit, Mich.; a 20-ton reverberatory furnace, with necessary core ovens and casting pits. Like the machine shop, the foundry was erected in such a manner that it can readily be enlarged in size at any time desired. The boiler house is located on the east side of the machine shop, and contains 125 horsepower boilers, equipped with Brightman stokers furnished by Samuel W. Hay, Pittsburgh representative of the Brightman Stoker Company, Cleveland, Ohio. The arrangements for receiving and shipping materials of the various kinds are admirable. A track from the main line of the Allegheny Valley Railroad extends the entire length, through the center of the machine shop and foundry, on which the shipping will be done, while on the east side of the foundry and machine shop is another track, extending from the Allegheny Valley Railroad to the Allegheny River, from which all materials will be unloaded. Two 20-ton and one 60-ton Fairbanks' railroad scales have been erected under the two tracks for the weighing of materials. All buildings are equipped with incandescent and arc lights furnished by a 40 horse-power electric generator, built by the Westinghouse Electric & Mfg. Company of Pittsburgh. The new concern will manufacture a full line of iron and steel works machinery, cranes of the various kinds, and sand, chilled and steel rolls. A contract has already been received from the Ohio Steel Company, Youngstown, Ohio, for a 42-inch roll lathe, and orders for rolls have been received from the Standard Iron Company, Bridgeport, Ohio; W. Dewees Wood Company, McKeesport, Pa.; Crescent Steel Company, Pittsburgh, Pa., and other concerns. The offices of the new firm are located at the works, with officials as follows: Isaac W. Frank, president and general manager, and Edward Kneeland, secretary and treasurer.



THE BOWSHER BALANCING WAY.

all kinds of work, such as cutter heads, pulleys, armatures, &c., and is designed to supersede the "horses" and other similar devices at present used in many machine shops.

No. 1 is intended to be set on the bench and to be used for light work such as shaper heads, small pulleys, armatures, &c. The greatest distance between the standards is 21 inches, and the height 9½ inches. No. 2 is adapted to stand on the floor, and is intended for general shop use and work of medium size. The distance between standards is 27½ inches, and the height 12½ inches. Although the next size is intended for heavy work, the standards will come sufficiently close together to accommodate the smallest work. The distance between the standards is 37 inches, and the height 24½ inches.

This tool is made by N. P. Bowsher of South Bend, Ind.

The scramble of New England manufacturers to obtain control of the Nova Scotia coal fields has created a boom without precedent in that region. Four large corporations now look to obtain charters

consisting of machine shop, foundry and boiler house, have just been completed, the first heat in the foundry having been poured on Monday, the 17th ult. The machine shop is a very substantial structure, built of brick and iron, and measures 100 feet in width by 100 feet in length. It is situated back from the railroad a considerable distance, and is built in such a manner that it can be extended in length at any time desired. The roof is supported by iron columns 10 x 25 inches, and a large skylight extends the entire length of the roof, affording an abundance of light in every part of the building. It is equipped with an electric traveling crane with 57-foot span and 30 foot lift, built by the Shaw Electric Crane Company of Muskegon, Mich. The machinery equipment is complete in every particular and consists of a full line of iron-working tools containing the most recent improvements. Included in the equipment are a number of 14, 20, 24, 30 and 60 inch Johnson lathes, furnished by Israel H. Johnson, Jr., & Co. of Philadelphia, also a 72 x 24 inch Powell planer, furnished by the Powell Planer Company of Worcester, Mass., and six 42-inch roll

Admiral Hopkins of the British war steamer "Blake" indulged in remarks highly complimentary of the proficiency of Americans in the art of shipbuilding. Speaking of the naval parade in New York harbor he said: "Your ships made a splendid showing. They are models of modern war vessels in many respects, and you may well feel proud of them. In fact, to day, in shipbuilding the United States is coming fast to the front. In all the great English and Scottish shipyards we are using American machinery to perfect a number of points about a vessel. With such resources as you have at home, and with such ingenuity and with so many improvements constantly being made, there is no wonder that you turn out such excellent workmanship." Philadelphia is complacent that all but two or three of the Americans were built on the Delaware.

The mower and reaper manufacturers in Akron, Ohio, are unusually active this season, six of the largest concerns located in that city being obliged to run day and night to fill orders. Crop prospects in all of the States east of the Mississippi are very good, judging from indications.

### Electric Arc Welding.

A subject of great interest to the artisan and metal worker is that of electric arc welding, so termed in contradistinction to incandescent electric welding, wherein the metals to be welded are caused to close the gap in an electric circuit of large volume and low electromotive force, whereby the current flowing in the metal causes it to become incandescent or raised to the welding temperature at the joint. With the electric arc may be obtained the highest temperature known to science, and in electric arc welding this tremendous temperature is utilized in heating the metal either by the directly applied arc in contact with the metal or preferably by placing the material in proximity to the arc, but not within it, and heating by radiation.

The material may be in circuit with the arc or independent of the arc circuit. In

results are experienced. C. L. Coffa of Detroit was the one to utilize and perfect this method, and we published in these columns (August 28, 1890) a description of some of the methods devised by him for obviating the difficulties above described and we now show herewith some of the machines, which will illustrate the most recent advance in the art.

In Fig. 1 is illustrated a machine for welding sheets of metal, the sheets being secured upon the carriage as shown with their edges in alignment. The electrodes are brought into contact with the sheet to establish the electric circuit, then raised slightly to form the arc; their edges being brought to a welding heat, the hammer is started, and as the weld is hammered the carriage automatically travels forward rapidly or slowly, as may be desired, bringing a fresh section of the seam under the hammer and arc, respectively. It will be observed that the electrodes are applied not immediately to the joint, but

all butt welds. The capacity of the machine is from  $2\frac{1}{4}$  inches per minute up to 3 feet per minute, according to the power consumed, operating upon metal of  $\frac{1}{4}$  to  $\frac{1}{2}$  inch in thickness, while the speed can be materially increased in operating upon No. 10 gauge metal, with less consumption of power. Agricultural tires of 8-inch face can be turned out at the rate of one to four per minute.

In this type of apparatus, by making changes occupying but a short time pipes of different diameters may be handled, and the range of the same machine may run from pipes of 6 inches diameter up to 60 inches diameter. These discoveries have reduced a plant for making pipe down to an engine and boiler, with a dynamo, a machine for bending the skelp into circular form and a few comparatively small and inexpensive machines, their number depending upon the amount of work to be done and the speed required.

The skelp, being put into shape, is put

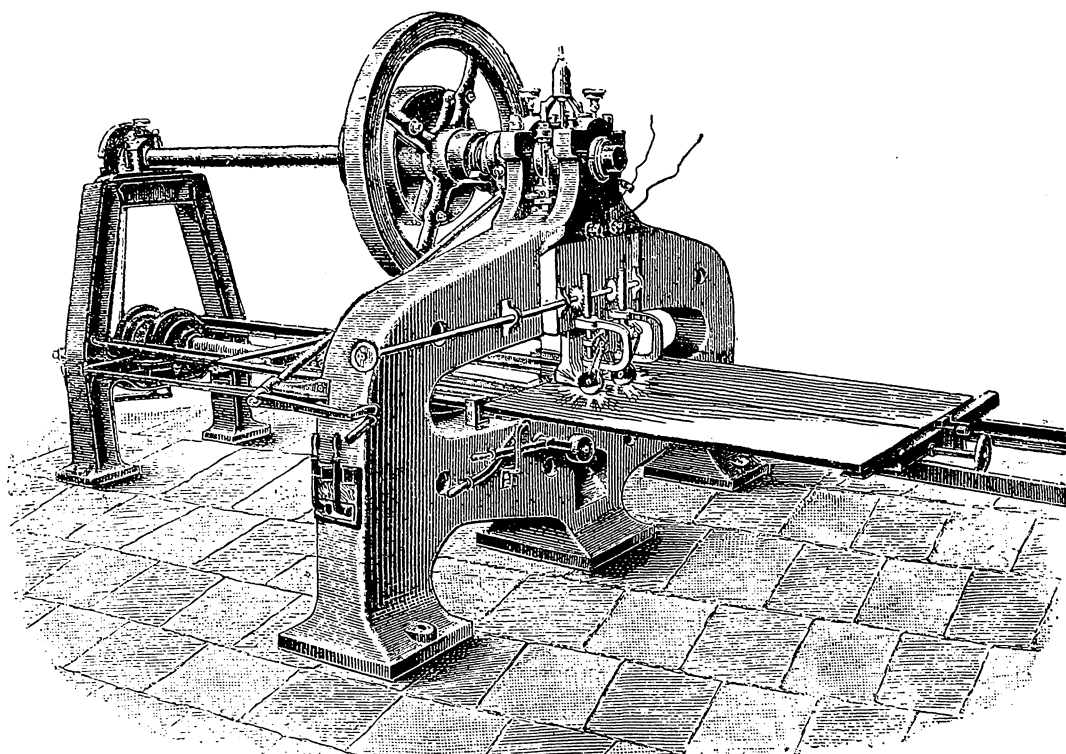


Fig. 1.

### WELDING SHEETS WITH THE ELECTRIC ARC.

the early attempts at welding with the electric arc the material to be welded was made one terminal or the pole of the source of electric energy, and a carbon electrode or tool connected to the other terminal of the source of electric energy brought into contact with the metal to establish the circuit, then raised slightly from the metal to form an electric arc and then slowly traversed along the joint until the metal was raised to the proper temperature.

With this method it was practically impossible to secure uniform regulation of the arc, while the proper regulation of the dynamo was out of the question. Aside from these difficulties, there was the very formidable and serious objection that the iron or steel was burned to a certain extent, the material at the joint lacked homogeneity; it appeared spongy, burnt, porous, often was chilled or converted into steel to a certain extent; the material at the joint seemed like rotten iron, was crystalline and had no strength. In placing the material in proximity to the arc but not within it and heating the metal by radiation none of the foregoing damaging

to each side of the joint, an appreciable distance from the line of the weld. The advantage of this arrangement is obvious—the heat is well distributed upon each side of the joint, the homogeneity and the integrity of the weld are thus assured; no altered metal or steelified material being carried into the joint by “seeping” or capillary action, as inevitably occurs where the directly applied arc is permitted to play immediately along the joint.

The rapidity of the action depends upon the thickness of metal to be welded and the power consumed in the arcs. This last factor can readily be adjusted to suit both the gauge of metal operated upon and the desired speed of the welding.

In Fig. 2 we show sections of pipe, drum blanks and agricultural tires all of 2 feet diameter. These articles were welded in the machine seen in the background and which they obscure. The process here used is that of placing the metal in proximity to the arc but not within it and heating the metal by radiation. This machine will handle either butt or lap welds. The articles shown are

upon the welding machine and clamped; then the heat of the voltaic arc, or of a series of arcs, is applied to a space only an inch or two wide on each side of the joint and the weld is made and finished without removing the skelp from the machine. With this small plant and with the small expenditure of power necessary to maintain a few arcs and to run the bending machine, pipe may be made; iron  $\frac{1}{4}$  inch thick may be welded at the rate of about 1 foot per minute, and by increasing the horse-power to an extent sufficient to maintain six or seven arcs instead of one or two this speed may be very materially increased, a 25 horse power engine being capable of welding about 2 feet per minute. As compared with the plant and cost necessary to manufacture pipe under the present methods this apparatus is insignificant.

In the present method the heating furnace must be large enough to take in the entire skelp and to heat it all sufficiently to bring its edges to the welding heat. Thus the heating effect, instead of extending over an inch or two adjacent to the



weld, extends over the whole skelp. When heated, ponderous machinery must be used to make the weld. If for any reason the skelp cools before the weld is all made it must all be reheated to the welding heat. The appliances must be such as to enable workmen to handle the skelp necessary for large pipe while at a heat that is unapproachable. But this is not all; while for pipe 2 feet in diameter  $\frac{1}{4}$ -inch iron has a tensile strength sufficient for almost every purpose to which it can be put, such iron is not heavy enough to stand up in the heating furnace, and simply for this reason, without any material advantage in strength, the thickness of the skelp must be increased to  $\frac{3}{4}$  inch, this excess of metal must be paid for, and must be heated. Thus in addition to the saving in cost of plant and manufacture the arc system of

the pipe is to be set up, provide a portable engine, freight the sheets to the spot and turn out finished pipe *in situ*. In other words, it is claimed that at a comparatively moderate investment every well equipped iron works in the country can produce with ease, and inexpensively, all the special or regular pipe required in its immediate vicinity, or may transport its plant to any point desired and manufacture the pipe on the spot.

#### The British Admiralty List of Reserved Merchant Cruisers.

For some years past the more important maritime nations have devoted considerable attention to the subject of the utilization

of additional vessels subject to requisition by the Admiralty without further subsidy. For the vessels borne on these special lists the permanent fittings have been provided to enable them to carry the batteries assigned, and the guns are held in readiness to be embarked should occasion arise.

There is also an Admiralty list comprising a very large number of steamers regarded as well suited for public employment in case of need, but which are not covered by any special agreement, although full particulars concerning them are on record. For admission to this list vessels must be constructed in accordance with certain requirements.

Prior to their coming under the American flag the "City of New York" and the "City of Paris" of the Inman line, now the "New York" and the "Paris" of the new American line, were included among the vessels receiving Admiralty subventions. Besides the omission of these names other changes will probably soon occur in the list of specially subsidized steamers. The "Campania" and the "Lucania" of the Cunard line will undoubtedly be added upon their completion, and it is reported that the "Etruria" and the "Umbria" of the same line will then cease to receive subventions.

According to the latest official British Navy list the royal naval reserved merchant cruisers now held by the owners at the disposition of the Admiralty are the following:

#### Vessels Receiving an Annual Subvention.

	I. H. P.	Gross tonnage.
Cunard Line:		
"Etruria".....	14,500	8,120
"Umbria".....	14,500	8,128
Peninsular and Oriental Line:		
"Victoria".....	7,000	6,091
"Britannia".....	7,000	6,061
"Oceana".....	6,000	6,188
White Star Line:		
"Teutonic".....	17,000	9,952
"Majestic".....	16,000	9,933
Canadian Pacific Line:		
"Empress of India".....	10,000	5,905
"Empress of China".....	10,000	5,905
"Empress of Japan".....	10,000	5,905

#### Additional Vessels Held by the Same Owners at the Disposition of the Admiralty Without Further Subsidy.

	I. H. P.	Gross tonnage.
Cunard Line:		
"Servia".....	10,000	7,392
"Gallia".....	5,300	4,809
White Star Line:		
"Britannic".....	5,200	5,004
"Germanic".....	5,200	5,008
"Adriatic".....	3,600	3,888
"Celtic".....	3,600	3,867
Peninsular and Oriental Line:		
"Arcadia".....	7,000	6,188
"Violetta".....	5,000	4,904
"Massilia".....	5,000	4,902
"Rome".....	5,500	5,545
"Carthage".....	5,000	4,879
"Ballarat".....	4,500	4,748
"Parramatta".....	4,500	4,736

The slowest of the vessels receiving subventions have a sea speed of about 16 $\frac{1}{2}$  knots, while the fastest can make 20 knots or more for a passage across the Atlantic. The vessels here shown as being reserved but without their receiving subsidies range in speed at sea from 15 to 17 knots. In the case of the Peninsular & Oriental Steam Navigation Company, having a fleet of more than 50 steamers and an elaborate system of routes connecting London with the East, including the Australian colonies, the two finest steamers belonging to the line do not appear. These are the "Australia" and the "Himalaya," both built recently and having a sea speed of about 18 knots. Negotiations are said to be pending which will probably lead to their addition to the foregoing list.

In the case of the vessels indicated as receiving an annual subvention the rate paid varies somewhat for the different

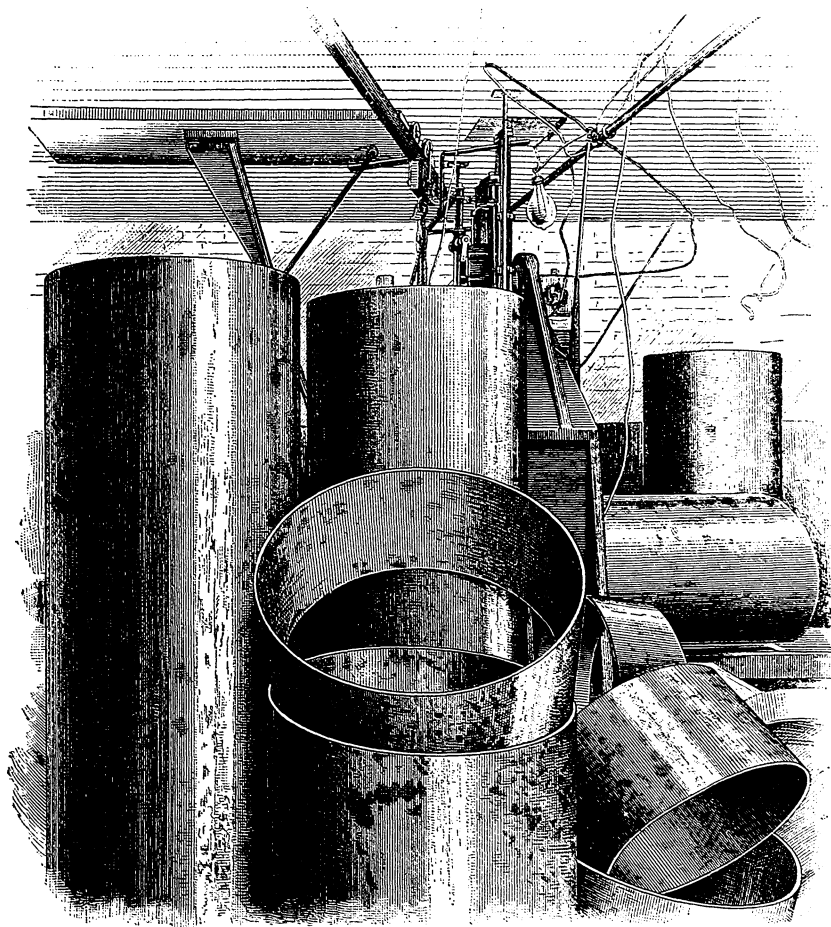


Fig. 2.

#### PIPE WELDED WITH THE ELECTRIC ARC.

welding saves one-third of the metal now necessary to make a large pipe.

Operating, for example, on 2 foot pipe with the machine and methods herein illustrated, the skelp used can be of  $\frac{1}{4}$  inch; the entire body of the skelp does not have to be heated, only a section 3 to 4 inches wide; the speed can be made to so accommodate itself to the workmen that a length of pipe can be made every 5, 10, 15 or 20 minutes, as desired, and with expenditure of moderate power. At the close of the day the machine is closed down; no night heat need be kept up, as is necessary in present practice; within a few moments the machine is ready for operation when again required. With this machine pipe of 2 feet diameter in No. 10 gauge has been made, and this is by no means the limit of thinness of sheets that may be employed.

The machine is portable, and it is possible to transport it to the vicinity where

of their fast merchant steamers for auxiliary naval purposes in the event of war. While the vulnerability of such vessels is so great as to prevent them from being regarded as suitable for employment in attacking armed cruisers designed with a view to combat, particularly since the advent of rapid-fire guns and high explosives, yet the high speed and large coal-carrying capacity of ocean mail steamships would no doubt enable them to render valuable service for special purposes in connection with naval operations.

In Great Britain, as the result of formal agreements between the Admiralty and several of the large steamship companies, a small number of fast steamers of the highest class receive annual subventions and in case of war are available for immediate public use as an armed force upon terms fixed by the existing contracts. In consideration of the subventions, the companies to whom they are paid hold certain

companies, but is about \$3 75 per gross ton register per annum. The annual subsidy for the "Teutonic," for example, is a little more than \$35 000. Admiralty subventions are entirely distinct from payments for ocean mail service.

With the exception of the "Campania" and the "Lucania," not yet completed, the "New York" and the "Paris," formerly on the Admiralty list of reserved merchant cruisers, are the largest, fastest and most powerful merchant steamships afloat. Now that they are available for service as auxiliary armed cruisers under the American flag in case of necessity, a special interest attaches to any of their characteristics having a direct bearing upon their value for such employment. It may well be noted, therefore, that while most ocean steamships of large size are slow in turning, thus lacking the power of maneuvering quickly, the "New York" and the "Paris" can turn rapidly, or in other words they have a small tactical diameter. According to a well-informed English authority, they are in this respect much more valuable as possible cruisers than any other large mail steamers available for such use. It is stated that the "Paris" can turn a complete circle in about six minutes. Another advantageous feature is the fact that these two steamers have both steering gear and rudder below the water line. The arrangement of the steering gear in merchant steamers is usually such as to involve grave danger of injury by projectiles.

The system now in force in Great Britain of paying annual subsidies in order that certain steamers shall be reserved for Admiralty employment upon stated terms in case of war results from practical experience gained about eight years ago at a period when war with another nation was looked upon as almost certain to occur. The present plan presents an attempt to avoid the anxiety and waseful expenditure connected with certain temporary precautionary measures hastily adopted at that time.

The view held by the Admiralty in 1837, as officially expressed, concerning the speed which the royal naval reserved cruisers should possess, was that no vessel of less than 17 to 18 knots sea speed would fully meet the end desired. It is probable that the standard would now be placed still higher, as the "Etruria" and the "Umbria" were at that time the fastest steamers under the British flag. Even with the prescribed speed, it was pointed out in the official statement to which reference has just been made that the best results could not be obtained unless the vessels were built to meet the Admiralty requirements as to design, and it was added that the object in view could not be gained without the payment of special subventions, because vessels constructed to meet the views of the Admiralty would be at a disadvantage in respect to their cargo-carrying powers.

The opinion was therefore expressed by the Admiralty that it would be a distinct advantage to the country if every reasonable encouragement were given to British shipowners to build and maintain steamers of the class desired. The number could not become excessive, the trades being very limited which would, from a commercial standpoint, warrant the building of such steamers as were thoroughly suitable for admission to the special reserve fleet.

An investment company, made up of Chicago and New York capitalists, have purchased over 3500 acres of land near Chicago upon which to establish three industrial communities, to be developed as rapidly as possible. The plans include the location of factories, development of railway connections, street improvement, erection of dwelling houses and construction of docks.

### Losses in Transmission of Heat.

BY PROF. R. C. CARPENTER, CORNELL UNIVERSITY.

When power is needed in various places at some distance apart, several methods present themselves. 1. One large plant from which mechanical power is obtained, and transmitted by long lines of shafting, or ropes or belts. 2. One large power plant from which power is obtained, and transformed into electrical energy, in which condition it is transmitted to electric motors, which perform the work. 3. Separate and complete steam plants located where the work is to be done. 4. One large boiler plant with separate engines, steam being transmitted in pipe lines to the various engines, located where the power is needed.

The discussion of such losses as occur in the transmission of steam, either for heat-

are located 50 feet apart. The line consists of 150 feet of 10-inch steam pipe and 2050 feet of 6-inch pipe, having a total heating surface of 5605 square feet. The pipe line was laid in 1889, and the test was made by Mr. Churchill within a few months of its completion.

For ascertaining the heat losses Mr. Churchill employed several methods. In one method sections of the line were taken, and calorimeter observations made on the steam as it entered and left the line. The result of this investigation indicated a loss of heat in a distance of 2025 feet of nearly 10 per cent. of the heat transmitted. The other method of determining the loss was to ascertain the amount of heat required to keep the line heated to its working condition, this being done by closing off all the buildings, and making certain that there were no leaks existing in the line. The heat required was determined by a boiler test.

Mr. Churchill considered this the more satisfactory method, although the results

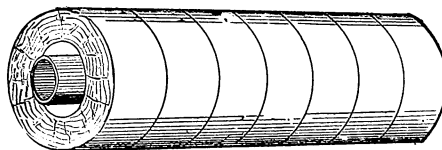


Fig. 1.

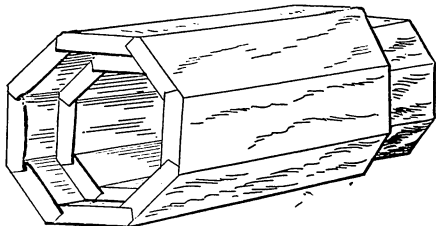


Fig. 2.

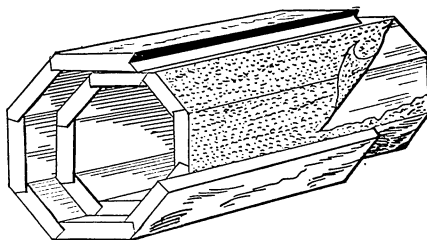


Fig. 3.

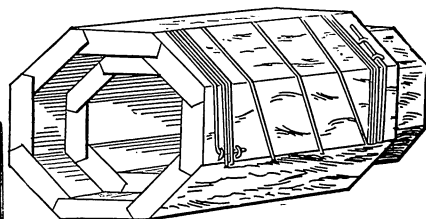


Fig. 4.

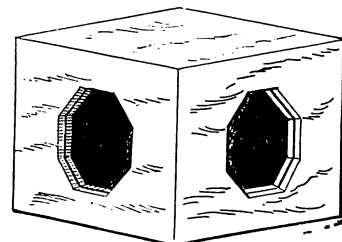


Fig. 5.

Figs 2 to 5.—THE WYCKOFF COVERING.

ing or power purposes, is the principal subject of this paper.

Heat for the buildings of Cornell University is obtained from a boiler plant at Sibley College, on the north side of the campus, and is transmitted by pipe lines laid underground to the various buildings constituting the university.

The pipe is laid in nearly a direct line to the various buildings, and is protected from heat losses by a wooden pipe; the pipe being made of a solid log, from which the central portion has been removed by a cylindrical saw. The bore of the wooden pipe is 2 inches greater than that of the iron pipe which is inclosed, and the thickness of the wood wall composing the pipe is 4 inches, thus making the outside diameter of the wood pipe nearly 10 inches greater than that of the inclosed iron pipe. The outside of the wood pipe is turned, protected by a spiral winding of hoop iron, and coated on the outside with hot coal tar and sawdust. It is seen that it insures for the steam pipe an air space of nearly 1 inch, and 4 inches in thickness of wood covering, Fig. 1.

The expansion of the line is provided for by variators made by Holly Mfg. Company of Lockport, N. Y., which

did not differ essentially from those obtained by the first method. Three trials were made, the results being as follows:

Loss in British Thermal Units.			
	Difference of temperature.	Total per hour.	Per degree difference of temp. Per sq. foot surface.
1st trial...	241°	1,021.370	4.237 0.755
2d trial...	235°	811.447	3.452 0.614
3d trial...	236°	932.119	3.991 0.713

The first trial was made when the ground was very wet, and some soil water reached the pipe. The third trial was made under unfavorable circumstances. For these reasons the second trial is considered as giving results which represent the pipe line under best conditions.

The loss per square foot for a naked pipe under the same conditions would have been 570 B. T. U., which is equivalent to 2 B. T. U. for each degree difference of temperature. That is, the heat loss in the plant tested is 30.7 per cent. of that in a naked steam pipe.

The surplus coal of the Lehigh Valley system, destined for the New York market, is unloaded by the Dodge system of coal-handling machinery, stored in enormous conical piles, and then reloaded, as the state of the market demands. The coal is distributed on either side of the track

for a distance of 1500 feet. The unloading and reloading machinery is heavy and requires in each case enormous power which is only in occasional use, so that the problem in this case is, the most efficient distribution of power to the various coal-handling plants. The system adopted was that of independent engines, provided with steam from a central boiler plant.

The engines are in each case simple automatic engines, made by the Buckeye Engine Company, and vary in capacity from 75 to 150 horse-power. They are operated only when the machinery to which they are connected is required. At other times no steam is supplied to them.

The steam is conveyed to the engines in

character of the soil and the difficulty of securing proper drainage, but was left on top of the ground, and protected by a rough wooden box constructed of 2 inch plank. The outer box is far from tight, and air enters freely at numerous cracks and holes, so that, except as a mechanical protection for the inner wood covering, it cannot be considered of great value, and is certainly inferior in non-conducting properties to a covering of earth.

The boilers for the plant are six in number, and are a vertical type of plain tubular boiler, built by the Stearns Mfg. Co., Erie, Pa. They are 6 feet in diameter, 18 feet high, and contain 316 flues, each 3 inches in diameter. Four of the boilers

Total length from boiler house to D engine, 747 feet, consisting of 250 feet of 6-inch, 106 feet of 5-inch and 391 feet of 4 inch pipe, having a total radiating surface of 1057.5 square feet. The line leading from the boilers is of 6-inch pipe to E engine house, then 5-inch pipe to the branch leading to A engine house, and the remainder of the distance is 4 inch pipe.

The engine was a 12 x 16, running with a piston speed of about 600 feet a minute, thus requiring, when cutting off at one-third stroke, a velocity of the steam of about 60 feet per second in the 4-inch supply pipe. As this pipe was 391 feet long, more reduction in pressure was anticipated than was actually found. As shown by the summary which follows, the actual reduction varied from 5 to 7 pounds, averaging 6 pounds.

The general method of testing adopted was such as to give information, first, as to the amount of water in the steam as it entered the steam pipe; second, the amount of water in the steam as it reached the engine; third, the amount of water collected at intervening drips; fourth, the total amount of steam used; fifth, the fall in pressure between the boilers and the engine.

Summary of Tests of Loss of Heat, Lehigh Coal Storage Plant, South Plainfield, N. J.

GAUGE PRESSURE.		TEMPERATURE.				MOISTURE IN STEAM.				Total weight of steam in line.	Remarks.
		(a) (b)									
Boiler.	Engine D.	Boiler house.	Engine house.	Outside air.	Calorimeter entering steam.	Calorimeter steam at engine.	Entering steam.	At engine.	Increase.		
lbs.	lbs.	F°	F°	F°	F°	F°	Per ct.	Per ct.	Per ct.	p. h.	
92	87	38	36	19	275	228	1.0	3.2	2.2	1700	
101	96	38	37	19	275	213	1.0	3.6	2.6	1300	
108	105	38	39	19	275	213	1.0	3.8	2.8	1305	
89	86	38	38	19	284	217	0.5	3.7	3.2	1190	E Engine
86	82	38	38	19	280	214	0.65	3.8	3.15	1080	only run-
83	77	38	38	19	280	220	0.6	3.4	2.8	1700	D fed
85	80	38	38	18	283	214	0.49	3.75	3.26	1100	loading
80	74	38	38	18	281	217	0.45	1.9	1.45	2500	
73	67	44	40	18	272	243	0.75	1.7	0.95	3600	
68	59	42	40	18	264	239	1.03	1.75	0.72	3600	
64	58	46	41	18	266	229	0.75	2.25	1.50	2510	
70	63	38	41	18	267	216	0.9	3.2	2.03	1600	
73	68	38	41	16	270	213	0.85	3.5	2.15	1500	
71	65	38	41	16	268	225	0.85	3.0	2.15	1800	
73	68	38	41	16	264	213	1.2	3.5	2.3	1800	
78	73	38	42	16	275	214	0.7	3.5	2.8	1500	
98	91	38	42	15	282	217	0.75	3.8	3.05	1300	
101	97	38	46	15	284	220	0.8	3.9	3.01	1200	
88	86	38	47	15	282	251	0.6	1.95	1.35	3300	E Engine
59	58	42	47	15	282	250	0.0	1.5	1.5	3000	D fed
58	52	42	47	15	282	239	0.45	1.5	1.5	3650	loading
58	52	48	47	15	267	214	0.55	2.8	2.25	1800	
56	48	50	48	15	267	222	0.5	2.3	1.8	3200	
61	55	50	48	15	267	217	0.75	3.0	2.25	1800	
68	62	50	48	15	266	212	0.6	3.0	2.4	1500	
68	60	50	48	15	266	214	0.9	3.2	2.3	1500	
72	68	50	48	15	270	213	0.8	3.2	2.4	1600	
73	67	50	48	18	270	228	0.8	2.6	1.8	1800	
73	72	51	48	18	276	228	0.65	2.5	1.85	1800	

Fig. 6.—DIAGRAM OF TESTS OF PROTECTING STEAM PIPE AT LEHIGH VALLEY STORAGE PLANT.

pipings, which is protected from heat radiation by the Wyckoff covering as now manufactured at Elmira, N. Y., by A. Wyckoff & Son. It consists of two concentric octagonal pipes, each built of 1-inch plank, and separated from each other by a very thick layer of water-proof paper.

The form of this covering is shown in Figs. 2 to 5. Fig. 2 represents a section of the casing complete. Fig. 3 shows pipe with a portion of the outer covering removed, showing paper. Fig. 4 shows coating removed from two staves, showing galvanized wire with which casing is wound. Fig. 5 shows the manner of casing tees and elbows. The top is put on with screws, and can be easily and quickly removed when necessary. The steam pipe is laid in the center of the wooden pipe, and is surrounded by an air space about 1/2 inch across.

At South Plainfield th's pipe was not buried in the ground, because of the wet

are sufficient to operate the plant at its usual capacity.

The expansion of the line is poorly provided for, there being one plain expansion joint and two offsets. The expansion joint is badly out of line, is located near the boiler house, and is practically inoperative. The result is that, when a given line is heated up, a great increase of length occurs, which is permitted by the branches leading to the various engines, but which, nevertheless, induces severe strains both in the pipe itself and in the outer wood covering.

The test of heat losses was made by myself, assisted by Messrs. Dunn and Mack, of the class of 1893, in Sibley College, Cornell University. The test was made only of the west line, and was confined to measurements of the loss of heat between the boiler house and D engine. The test was made February 17, 1893, and was of eight hours duration.

Average amount of water caught in drips, 45.1 pounds per hour.

Average amount of water indicated by calorimeter, 36 pounds per hour.

A study of the summary shows that the loss was sensibly constant during the run. This is clearly shown by noting the fact that any increase in the amount of steam flowing through the line had the effect of decreasing the percentage of moisture at the engine.

The total loss per hour was equivalent to that required to evaporate (36 + 45.1 =) 81.1 pounds of water from a temperature of 212° F. to a pressure of 70.1 pounds by gauge. This is equal to (81.1 x 893 =) 72,322 B. T. U. The average steam pressure was 70.1 pounds by gauge, its temperature 313.6° F., the average outside temperature 16.6° F., hence the difference of temperature was 297°. The loss for each degree difference of temperature becomes (72,322 ÷ 397 =) 244.2 B. T. U. per hour. The total radiation surface was 1057.5 square feet, hence the loss in B. T. U.

per square foot per hour was 0.2315 per degree difference of temperature.

The loss for a naked steam pipe under the same conditions would have been 2.93 B. T. U. per square foot of surface per hour, or the loss of the covered pipe is reduced to 7.87 per cent. of the bare steam pipe. The entire loss for the transmission is equal to the coal needed each hour to evaporate 81 pounds of water, which can be approximately stated as 10 pounds, since the evaporation of 8 pounds of water by 1 pound of coal is not an unreasonable assumption. Expressed as a percentage of maximum capacity of the line, this loss will not exceed 1 per cent., although it reached 2.3 per cent. of the maximum heat transmitted during the test.

The diagram, Fig. 6, shows the variation in the various quantities which occurred at each observation during the test. It will be noted that the total loss expressed in pounds of steam condensed remained practically constant. This has the effect of decreasing the percentage of moisture present in the steam when the total amount of steam passing through the line increased. It is also of interest to note the parallelism of the two lines which represent respectively the pressure at the boiler and at the engine, nearly 750 feet distant.

These figures compare favorably with any other method of power transmission, even when the fact is considered that the line during the winter months is kept hot night and day, while the power is actually used only during the day. This would not at the most more than double the latter number, and even if considered would not make the loss of power transmission exceed 5 per cent. of that required to do the work.

A comparison of the two methods of protecting steam pipe shows the following: Column A is for pipe under ground and protected by solid wood piping with shell 4 inches thick. Column B is for pipe in square wooden box and protected by the Wyckoff covering 2 inches thick.

	A.	B.
Loss in B.T.U. per square foot of surface, and per degree difference of temperature.....	0.614	0.231
Per cent. that loss bears to that of a naked steam pipe under the same conditions.....	30.7	7.9
Relative value of covering.....	1	2.66

It is not the object of this paper to make any comparisons between different systems of transmitting power or of heating buildings, and with a single remark the conclusions will be drawn.

At Cornell University the various buildings had been heated by separate plants before the introduction of the system described. After the introduction of the new system it was found that, despite its large wastes, the buildings were heated better and more economically than before; chiefly due to the fact that the new boiler plant was made more efficient and was arranged so that a cheap grade of coal could be successfully burned, yet, as shown by the foregoing tests, the heat losses might have been reduced by a better covering to less than 40 per cent. of those actually found.

It is easily possible to calculate the surface required to condense 1 pound of steam from the data given in the tests. Thus, to change 1 pound of steam at atmospheric pressure into water at a temperature of 212°, 967 B. T. U. must be absorbed.

The loss in transmitting power by any system is largely constant, and hence when the power is greatly increased the percentage is correspondingly reduced. The following estimate is based on the transmission of 100 horse power 1000 feet.

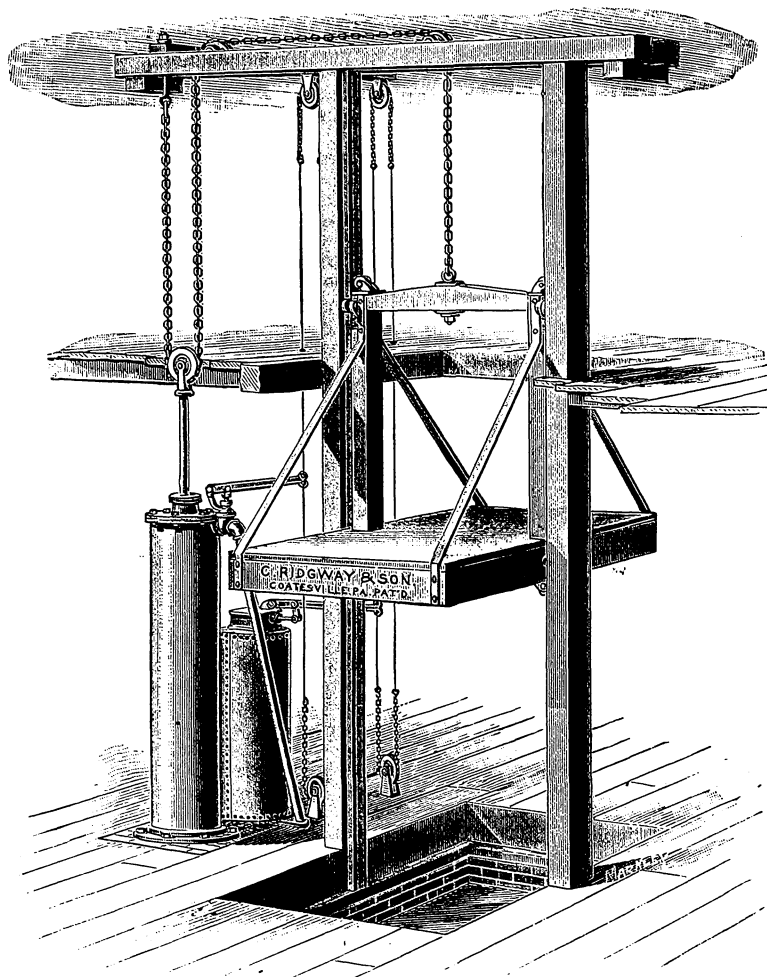
Method of Transmission.

	Percentage of loss.
Line shafting:	
Loss by friction (average 25).....	15 to 40
Electricity:	
Loss in transforming from mechanical to electrical, and vice versa.....	20 to 30

Line loss.....	2 to 5
Total loss.....	22 to 35
Conveying steam:	
Naked steam pipe (still air).....	37.6
Pipe covered with solid wood and earth.....	11.2
Pipe covered with solid Wyckoff's covering.....	4.2

Since the table gives the loss caused by each square foot of surface for a difference in temperature of 1° between the steam in the pipe and the medium outside, we have only to divide 967 by the product of the number representing the difference of temperature and that showing the loss. Calculation made in this manner gives the following values for the amount of surface to

motion of the piston rod is doubled and that the cage is supported by a single strand of chain. In machines of larger capacity the chain is always doubled and each strand is of ample size to safely support the maximum load. Wire rope is used when preferred and any number of strands can be employed. The same principle is also used in a direct-connected elevator in which the platform is placed upon the piston rod. The style illustrated is that most urged by the builders, Craig Ridgway & Son of Coatesville, Pa., because all the parts are upon the surface of the ground and are always under the eye and



THE RIDGWAY STEAM HYDRAULIC ELEVATOR.

square feet required to condense 1 pound of steam:

Condition of pipe.	Difference of temperature between steam and air.		
	1°	180°	200°
	Sq. ft.	Sq. ft.	
Naked pipe.....	483	2.7	2.4
Pipe protected solid pipe (case A).....	1,570	8.7	7.8
Pipe protected Wyckoff covering (case B).....	4,170	22.1	20.8

The Ridgway Steam-Hydraulic Elevator.

The Ridgway steam-hydraulic system for the handling of heavy weights, and with which most of our readers are familiar, has been applied to elevator service. The accompanying cut shows this method applied to an elevator of the kind usually employed for taking up stock to furnaces and cupolas. It will be observed that the

readily accessible. The space required for the cylinders is so small that there are few situations in which it cannot be afforded. It is not at all imperative that the cylinders shall be placed by the side of the elevator well; they can be set anywhere, even quite a distance away. The builders mention as a very important advantage the fact that the elevator is unlimited as to speed. The foreman in an instant can set it at any desired speed and then place it in the hands of an ordinary laborer, who cannot operate it any faster than the speed at which it may be set. Sudden throwing of a full head of steam on an empty elevator makes no difference, as it moves at same set speed whether empty or loaded. It is claimed that this elevator is far more economical in the use of steam than any of the usual types of hydraulic elevators. These elevators are also made for passenger service and are built of any capacity up to 25 tons and for any desired height of lift.

Smokeless powder, manufactured at the Government works at Newport, has been tested with satisfactory results in guns up to 6 inches caliber.



## WORLD'S FAIR NOTES.

### The Fine Arts Building.

There are two annexes to the main art galleries. These are called the east and west pavilions, says the *Chicago Herald*, and their connection with the central pavilion is by means of corridors, which are also used as galleries. The east pavilion contains the French Government exhibit, and also the French masterpieces owned by Americans. The west pavilion contains the Italian exhibit and the exhibits of several other foreign countries whose space is limited. The central pavilion has two floors for the exhibit of paintings. The northeast section, or one-fourth of the space for paintings, is devoted to the works of United States artists. The southeast section is given up to Great Britain and Canada. The southwest section contains the works of art sent by Holland, Spain, Russia and Japan. The northwest section contains all the German paintings. In general terms, the oil paintings are all hung on the ground floor in the central pavilion, while water colors are on the second floor. There is an overflow exhibit of oil paintings upstairs in the American section.

Between these four quadrangles are four courts and the central rotunda. The north and south courts will contain the groupings of statuary. The east and west courts will contain the architectural exhibit. Here will be seen structures and casts illustrating ancient, mediæval and modern architecture. There will be cases of antique and modern carvings, and architectural drawings will be hung on the walls.

The central rotunda will contain a heroic figure of Washington by Thomas Ball. On the sides of the rotunda are 12 spaces for figure groupings furnished by different foreign countries. There are also rotundas in each of the smaller pavilions, where statuary and architectural specimens will be grouped. There are 80 galleries in all, including the east and west pavilions. These range from 30 feet square to 36 x 120 feet for the exhibition of paintings. There are also 108 alcoves, fronting on the court of the central pavilion. Twenty-eight of these are on the first floor and 80 on the second floor, and much additional wall space is gained by their use. Engravings, etchings and black-and-whites are mainly up-stairs with the water colors, and pastels are down-stairs with the oils.

It is almost needless to say that the lighting arrangements are as faultless as can be devised. All the pavilions, including rotundas, courts and galleries, are lighted from above. The modulation of natural light in the daytime is simple and effective. The system of artificial lighting at night will be a work of art. Myriads of incandescent lamps will shed a mellow radiance over courts and galleries. The electric lamps are arranged in clusters above each court, and also in continuous rows around the galleries. The attractiveness of the art galleries at night will be one of the features of the exposition.

So much praise has already been bestowed on the exterior architecture of the Fine Arts Galleries that little need be said on that score. Those who have seen the finished structure are enthusiastic over Mr. Atwood's magnificent design, and even the lay public pronounces it the architectural gem of the exposition. Whether seen for the first time across the lagoon from the south or from the main approach to the north, the splendid proportions of the classic pile lend dignity and charm to the varied surroundings.

The main building is the Grecian-Ionic architecture of the most refined

type. The order is taken from the Erechtheum of the Acropolis at Athens. The east and west pavilions are of harmonious proportions. The entire structure is practically fire proof. The main walls are of brick covered with staff, and the roof is of iron, steel and glass. The circular stairways in the central pavilion are of iron. The aggregate length of all the pavilions is 1152 feet and their aggregate depth 504 feet.

The main approaches to the art galleries are imposing in design, and will be arranged in harmony with the general effect of richness and classic simplicity. To the north, and facing the State buildings, there is a Grecian court. A broad flight of steps leads up to the portico and colonnade. In the court are broad grass plats, which will have simple elevations of palms in unique vases. Near the outer extremity of the court there is to be a pedestal statue of Augustus Caesar. On each side there will be a Roman exedra, or semi-circular stone bench. At each end of the court the classic decorations will be in the form of copies of the choragic monument of Lysicrates from Athenian ruins. Fountains and garden seats will combine estheticism and public comfort.

To the south the main approach to the art galleries faces directly on the north lagoon. A broad flight of steps leads down from the portico to the surrounding driveway. From the latter another still broader flight of steps leads down to the water landing, where the electric launches will take passengers for other parts of the grounds and deposit visitors to the art galleries. This is the most northerly water landing on the grounds.

It has been often said that the World's Fair architecture is destined to create a new era in the design of modern buildings. Scattered around are lessons in the composite, the mediæval, the renaissance and all the schools. Here in the art galleries the classic model is pure and superbly designed in keeping with its purpose. The interior exhibit, moreover, contains the greatest collection of architectural specimens ever brought together. The growth of the art from ancient and mediæval times to the present, and the various applications of sculpture to architectural forms are here illustrated. Thus the outer and interior exhibits of this department of fine arts will in themselves constitute one of the crowning glories of the exposition.

### Permanent Beauty of Jackson Park.

The landscape art of the exposition is one of the best things it has to show, and fortunately the best of it can be kept as the leading features of a splendid pleasure ground that will comfort thousands when the World's Fair is history. Its chief glories are the lagoon and islands and these can and should be preserved intact. The group of islands consists of the Wooded Island, Hunters' Island and a number of attendant isles and islets, some of them only large enough to give foothold to graceful semi-aquatic plants.

The treatment of the entire group is so artistic that one thinks only of nature—a result that should give satisfaction to the most exacting landscape artist alive. Plantations of such trees as make a rapid growth have been added to a grove of indigenous oaks. Outside of these the islands are fringed with shrubbery and great stretches of wild flowers growing in colonies as they do on the prairies and borders of woodlands, and in marshes all through Northern Illinois. Semi-aquatic plants troop down to the brink; tall reeds and other water plants rise from the lagoon itself, and on it its quiet surface lily leaves float dreamily, while the low outlying isles are tinged a living green by the sedgy things that creep to the water's edge.

Few realize the vast amount of work that has been done by the Landscape Department to bring about this and other delightful results. The planting alone, which is merely putting on the trimming after the dress is made, has been an enormous work. A work, too, that had to be done in a limited time and with a sure hand. There was no time to try again. The first trial meant success or failure, luxuriance or barrenness. No one who saw the islands last fall, when they stood painted to the rim with splendid masses of foliage and glowing groups of wild flowers, failed to appreciate the remarkable success of it all, although few knew what it stood for in detail.

There have been planted on the islands and in other parts of the grounds 12,618 trees, 50,644 shrubs, 151,394 hardy perennial, herbaceous and miscellaneous plants, 136,678 aquatic and semi-aquatic plants, 3300 ferns, 9582 vines, climbers and ornamental grasses, 60,000 willow cuttings, 114,920 bulbs and similar plants, and a great collection of native plants, which were used by the carload. Most of the latter are such as grow in the swamps, lanes and woodlands of Michigan, Minnesota, Illinois and Ohio, but several other States are represented. The trees used were principally willows, poplars, water maples, cherries, elms and lindens. The shrubbery consists of various kinds of low-growing willows, cornues, spireæas, loniceras, lilacs, snowballs and berries. These form the basis of the groups, but to give variety and test their adaptability to the climate many rare shrubs were added. The splendid success of this part of the work is modestly attributed by the superintendent of Messrs. Olmstead & Co. to the weather. The dry fall of 1891, followed by a mild winter and wet open spring, certainly was a propitious series of seasons for the work in hand, but that does not dim the fact that efficient head and hand work—all done under pressure—has been accomplished.

The inner, higher part of the wooded island, reserved for the use of the Floricultural Department, was laid out in lawns, flower beds, and a rose garden, while the extreme north end space was set apart for the Japanese Temple and garden, which are to remain as a permanent reminder of the patience, ingenuity, gentleness, good will, and love of beauty of the nation of artists. The flower exhibits on the island will form a long and charming procession. The wooded island is about 16 acres in extent, ten of which are devoted to the plantations of trees, shrubs, and native plants already described. Through the middle is the long sweep of lawns and flower garden, about six acres in all. At the south end of this space will be shown for the first time, it is believed, in the West a combination of plants and style of grouping that is seen on large places in the East, notably on the grounds of the Newport home of the late Miss Catharine Wolf, consisting of well-placed azaleas and rhododendrons; and in the partial shade of these shrubs great clumps of lilies in many varieties will be planted. The bulbs and shrubs bloom at different seasons, and thus the arrangement affords double pleasure.

Over the lawns north from this fine exhibit will be seen a green and flowery wall, the first hint of the rose garden—the glory of the island. This is a plot of 1½ acres, oblong in shape, and will be inclosed by a wire fence supported by posts 9 feet high set at intervals of 8 feet. Between the posts the wire netting droops in curves, the lowest point of each curve being 6 feet above the ground. The fence will be lined with climbing roses, and draped on the outside with many kinds of light-growing creepers. This gracefully shaped, vine covered, flower-starred wall will be in itself a

thing of beauty. Access to the interior will be at four points only, in the middle of each side and at the middle of each end, so the garden will possess the first requisite of a garden—seclusion. It will also possess the second—flowers. The plot is divided into 36 beds of various sizes and shapes. Between the beds broad graveled walks wind their way to a pretty little pavilion in the center also smothered in vines. Surrounding the entire garden runs an irregular border, bounded on the outside by the green wall and on the inside by a continuous promenade. Fifty thousand roses are to be grown in the garden. Thirty thousand of them belong to the taller-growing, hardy class, and will be found in the beds. Twenty thousand tea and other tender roses of the low-growing kinds will fill the border, where they can be seen to the best advantage and have the grateful shelter from the wind of the growing wall.

The rose garden will be a revelation. On moonlit nights people will wait there to hear the nightingales that sung around the rose bower that blossomed by Bendemeer's stream. North of the garden will be found a great nursery exhibit, where the foremost growers of nursery stock will show ornamental trees and shrubs, such as home makers should know and use. Here will be specimens of everything of that class desirable for the decorative planting of either large or small places. West of the nursery exhibit a number of florists will have a great show of hardy herbaceous plants, one firm alone sending 10,000 plants. Still west of these England will justify herself for clinging to fine old herbaceous perennials, such as peonies, phloxes, &c., a class of plants grown to perfection by the English. Just south of the approaches to the Japanese garden Germany will display her formal favorites, such as stocks, asters, zinnias and dahlias. Thus the whole sweep of the lawns from end to end is utilized by the best-known plantsmen of Europe and America for their large and attractive exhibits.

The islands will be a great object lesson in beautiful landscape effects, while the interior of the largest one will show a series of object lessons as to what and how to plant, although not just where to plant it, as the space is too limited to admit of the best grouping.

#### The Midway Plaisance.

Those who visit the exposition to be entertained and amused as well as instructed will be greatly interested in the peculiar features of the Plaisance. This is a long strip of ground running at a right angle from the west boundary of Jackson Park. It is entered by a broad passageway near the Woman's Building. A macadamized street, formerly the Boulevard, from Jackson to Washington Park, extends through the center of this strip of ground, fronting on which are all sorts of structures built by persons who secured concessions for that purpose. An admission fee is charged for entrance to each of these attractions. The Plaisance is cosmopolitan. There is a "Street in Cairo," on which are quaint Egyptian buildings, peopled by shrewd merchants with their families. An Irish village is to be seen, as well as a reproduction of German home life. A Javanese settlement is shown, with its quaint huts and their thatched roofs and broad porches. The Turks have their mosque, Moors and Algerians have erected special pavilions and even the natives of Samoa are represented in this motley gathering. A famous German wild beast tamer has erected a large arena in which he exhibits his skill and prowess. Towering above everything is the huge Ferris wheel, about half completed, but covered with a swarm of busy workmen.

#### Tardy Exhibitors Will Suffer.

There are exhibitors who will not be ready on May 1, the same kind of men

as a rule as those who are forever trying to take a 7.32 train at 7.34. They will find that it will be more expensive and difficult to get exhibits in place after the opening than it has been. The rule in regard to bringing exhibits on the grounds after the fair has been opened is that the goods must be delivered to one of the two warehouses belonging to the exposition, one of which is located at Sixty-seventh street and the other at Midway Plaisance. From there they will be taken into the grounds by the exposition teams during the night. This force of trucks will do its work in the night after the fair opens and the visitors will not see any belated exhibits arriving and will not see any of them put in place, for this work must be done during the hours that the gates are closed.

#### Treasury Decisions.

##### Combination Rifle and Shotgun.

Before the United States General Appraisers at New York, January 18, 1893. In the matter of the protest, 10,545a, of H. Werlemann, against the decision of the Collector of Customs at New York as to the rate and amount of duties chargeable on certain combination sporting rifles and breech-loading shotguns imported per "Westerland," December 5, 1890. Opinion by Sharretts, General Appraiser.

We find that the appellant imported into the port of New York, December 5, 1890, certain double barreled breech-loading firearms. These firearms are composed of metal and wood, metal the component material of chief value, and are in part sporting rifles and in part breech-loading shotguns; that is, one barrel is a shotgun barrel and the other barrel a rifle barrel. Duty was assessed upon these guns at \$6 each and 35 per cent. ad valorem, under paragraph 170, N. T. The appellant claims that they are dutiable at 45 per cent. ad valorem, under paragraph 215, N. T., as manufactures of metal.

In our opinion the contention of the appellant is well founded. Paragraph 169 covers muskets and sporting rifles and paragraph 170 provides for breech-loading shotguns and revolving pistols.

The articles in question are combination sporting rifles and breech-loading shotguns, and cannot properly be classified under either of the paragraphs named.

In the case of Schoverling vs. Hedden, decided by the United States Circuit Court for the Southern District of New York (in the year 1889, unreported except in Treasury Synopsis 9772), it was held that combination guns of this kind were neither rifles nor shotguns, and were, therefore, dutiable, under paragraph 202 of the act of 1883, as "firearms," said paragraph reading, "muskets, rifles, or other firearms." In this decision the Government acquiesced in the opinion of the Attorney-General that no appeal should be taken.

There being no provision in the present act for other firearms, we hold the guns in question are articles not specially enumerated or provided for, composed wholly or in part of metal, and dutiable at 45 per cent. ad valorem, under paragraph 215.

The decision of the Collector is reversed and the protest is sustained.

##### Bicycle Wheels.

Before the United States General Appraisers at New York, January 30, 1893. In the matter of the protests, 32,716a-17,064, of Shoverling, Daly & Gales, against the decision of the Collector of Customs at New York as to the rate and amount of duties chargeable on certain bicycle wheels, imported per "Tauric" and "Alaska," June 8 and 21, 1892. Opinion by Somerville, General Appraiser.

We find that the merchandise covered by the protest in this case consists of 20 bicycle wheels, made of metal and without the usual rims. The articles were as-

essed for duty at 45 per cent. under paragraph 215, new tariff act, as manufactures of metal. They are claimed to be dutiable under paragraph 185 of said act, which reads as follows: "Wheels, or parts thereof, made of iron or steel, and steel-tired wheels for railway purposes, whether wholly or partly finished, and iron or steel locomotive, car, or other railway tires or parts thereof, wholly or partly manufactured, 2½ cents per pound, and ingots, clogged ingots, blooms for the same, without regard to the degree of manufacture, 1½ cents per pound: *Provided*, That when wheels or parts thereof, of iron or steel, are imported with iron or steel axles fitted in them, the wheels and axles together shall be dutiable at the same rate as is provided for the wheels when imported separately." The board has held that the term "wheels," as used in this paragraph, was confined to such as designated "for railway purposes" (G. A. 889 and 271), and this view was affirmed on appeal by Judge Blodgett, sitting as Circuit Judge for the Northern District of Illinois on June 18, 1892. Following that decision, we overrule the protest and affirm the Collector's decision.

##### Drawback on Litharge.

On the exportation of litharge manufactured by the Chadwick Lead Works of Boston, Mass., wholly from imported pig lead, a drawback will be allowed equal in amount to the imported lead used in the manufacture, less the legal deduction of 1 per cent.

The quantity of the material so used shall be determined by allowing 93 pounds of lead for each 100 pounds of the exported litharge, the net weight whereof must be ascertained by a United States weigher.

##### Drawback on Tin Cans.

In ascertaining the drawback to be allowed under the provisions of section 25 of the act of October 1, 1890, on 5-gallon rectangular tin cans made from a combination of two plates 14 x 18½ inches with one plate 10 x 20 inches, the quantity of tin plate used shall be determined by allowing for each 100 cans exported 52,460 square inches of 14 x 18½ plates, or 1.6117 boxes of 124 sheets each, and 19,944 square inches of 10 x 20 plates, or 0.4432 of a box of 225 sheets each.

##### Drawback on Carpet Sweepers.

On the exportation of carpet sweepers manufactured by the Bissell Carpet Sweeper Company of Grand Rapids, Mich., from imported tin plate of 1X quality, 14 x 20 in size, a drawback will be allowed equal in amount to the duty paid on the tin plate used in the manufacture, less the legal retention of 1 per cent. The quantity of the material so used shall be determined by allowing 140 square inches of plate for each exported sweeper.

The annual meeting of the members of the Mahoning and Shenango Valley Iron Manufacturers' Association was held in Youngstown, Ohio, last week. The following officers for the ensuing year were elected: J. G. Butler, president; W. Scott Bonnell, vice-president; W. E. Taylor, treasurer, and H. S. Evans, secretary. The following Executive Committee was appointed: James Neilson, E. A. Wheeler of Sharon, Pa.; George D. Wick, John J. Spearman of Sharpville, Pa.; Robert Bentley and John F. Taylor. The question of adopting standard time was discussed, and it was finally decided that the change would not be practicable, as it would necessitate an entire change in working hours. Other matters of considerable importance were discussed, but no definite action was taken in regard to them.



### The Stirling Packingless Valve.

There is probably no one feature of the numerous styles and types of globe and gate valves from which more trouble—or, to say the least, annoyance—is experienced than that which is common to all—the stem packing. The valve proper—that is, the disk or gate and the seat—has been made the subject of many important improvements, and there are a score of well-known makes in which this feature may be regarded as satisfactory, both as to efficiency and desirability. But the stem stuffing boxes will leak, and while this is not necessarily due to any essential defect of construction, so far as the possibilities are concerned, the leakage is an undoubted fact, which is none the less objectionable that it might be prevented by exercising the proper care in originally packing, and subsequently looking after, the stuffing box. If this is not done—as it is not, in many instances—there will be a leakage. Or if carefully packed, and not frequently inspected, tightened and renewed, as the

valves have received no attention or repairs of any kind, and yet they are absolutely free from leakage around the stems and work as freely as when new. The large engine is very highly finished and is kept bright and clean; the throttle valve, therefore, is not only made to correspond in point of finish, but it must also be absolutely free from leakage around the stem, as but very few drops would seriously mar the immaculate appearance of the bright work located directly under the valve unless some provision were made to receive the drip, which is not the case. As may be seen by reference to the illustrations, the self-packing device is extremely simple and may be used with any style of disk or gate valve in which the opening and closing are effected by rotating the stem, no matter what the resultant motion as regards the valve proper may be. The body or case D is of the ordinary pattern, as are also the valve seat G and face A. Upon the upper side of the disk, however, there is a hexagonal sleeve, *a a*, Figs. 1 and 2, which is threaded internally to receive the corresponding screw *b* of

the stem beyond that point. If for any reason it is desired to reverse the direction of admission so as to have the pressure on back of valve when closed, the slight play in the thread *b* will permit the necessary contact at *c'* to prevent leakage, while the valve proper is also held to its seat by the pressure on its back.

In the first position, it is obvious that even if the valve should leak there could be no escape past the stem, as even a moderate pressure by the screw on the valve would cause the packing valve, as it may be termed, to become perfectly tight. If the leakage through valve were considerable of course the accumulation of pressure on the back would be sufficient to act on the packing valve in addition to the pressure from screw. As there is the entire area of the large end of the seat *c'* exposed to the unbalanced pressure above the valve, it is obvious that there is very little possibility of leakage from the firmness with which the two surfaces are held in contact. As to the durability of this portion of the device, the fact of its remaining in good condition after two years' service enables

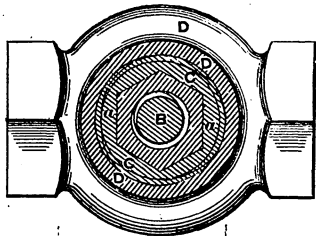


Fig. 2.—Section on Line F F.

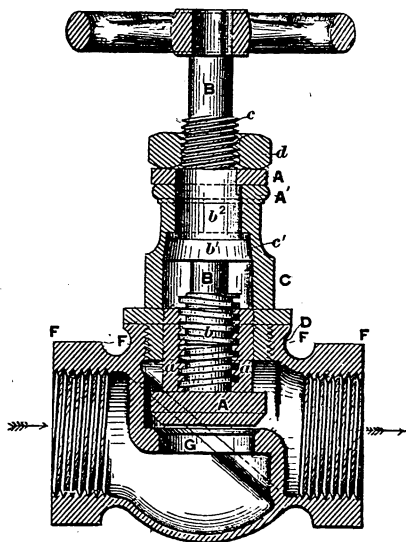


Fig. 1.—Vertical Section.

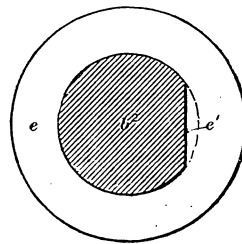


Fig. 3.—Section at A'.

### THE STIRLING PACKINGLESS VALVE.

case may require, the result will be the same. Many valves are so located as to render it extremely difficult, or even impossible, to renew or tighten the packing without closing the valve, and this may not be admissible without causing considerable inconvenience. Again, it is a very common thing that the valve is used for some duty for which it is required to be but seldom manipulated, being left for long intervals in either the open or closed position. In such case the packing may go on quietly rotting out, and the necessity for attention may not be discovered until a very considerable amount of leakage renders it apparent. From all of which it would appear that a device which can successfully eliminate the packing question without necessitating any changes in the essential features of design or construction of the existing types of valves is unquestionably an important improvement, and well worth the attention of valve users.

The Stirling packingless valve, as shown in the engravings, has been in continual use for over two years at the Philadelphia Shafting Works of Geo. V. Cresson Company. The sizes used vary from an 8-inch throttle valve on the main engine to the 1/4-inch for various purposes of steam and water throughout the entire works. During the entire period of their use the

valve stem. The sleeve is made to fit freely into a female hexagonal bearing in the part C of the body, which acts as a guide to the valve and also prevents its turning with the stem in opening and closing. The valve stem B is made with an enlarged diameter, *b'*, which gives large bearing surface and is also rendered necessary to enable the hole to be of sufficient size to permit the passage of the screw *c*, it being inserted from the inside. Below the bearing *b'* is the angular enlargement *b''*, working against the conical bearing *c'*, with which it is ground to form a steam-tight joint. The collar, or washer, *e*, Fig. 3, is seen to have a segmental projection in the hole, which is seen to fit upon a corresponding flat on the valve stem. The nut *d* is made to fit snugly on thread *c*, to hold it in position without the use of a jam nut. The adjustment of the stem is made so as to allow perfectly free motion of the stem between the collar *e* and the cone *b'*.

We will suppose the steam to be admitted in the course of arrows, Fig. 1, and the valve closed. By revolving the stem to the right, the left-hand thread *b* screws into the valve and permits the pressure to raise it from its seat. At the same time the conical bearing on the stem is pressed against its seat *c'* and forms a self-acting valve to prevent leakage around

it to speak for itself. Any information regarding the valves can be had by addressing Antonio C. Pessano, general manager, Geo. V. Cresson Co., Eighteenth street and Allegheny avenue, Philadelphia.

One of the Blake high-duty pumping engines of 10,000,000 gallons capacity, furnished to the city of Toronto, Ont., has been tested under the rules laid down by the American Society of Mechanical Engineers. The engine was guaranteed to perform a duty of 110,000,000 foot-pounds on a 24-hour trial on the heat unit basis, and the average run of 61 days of this engine shows an actual duty of 112,357,760 foot-pounds. At a meeting held Monday, April 24, the engine was formally accepted by the Board of Aldermen, and a contract for another engine of the same size was awarded to the Blake Company. This last will make the fourth high-duty engine that the Blake Company have furnished for the city of Toronto, Ont.

The Craig Shipbuilding Company, not long ago built for the Ann Arbor railroad two steamers which together cost \$437,000. Payment not being forthcoming a bill of complaint was filed and as a result the road went into the hands of a receiver.

## THE WEEK.

While the prices of farm products in the United States have steadily declined, the same cannot be said of the wages of the agricultural laborer. Within 50 years they have almost doubled, and are now only approached by those paid in Australia. The following averages, as compiled by Mr. Drage, in his late report on labor questions in the United States, show the wages paid for agricultural labor in this country compared with those abroad: The annual average in the United States is \$282; in Great Britain, \$150; in France, \$125; in Holland, \$100; in Germany, \$90; in Russia, \$60; in Italy, \$50; and in India, \$30. This high rate is partially attributable to the comparative scarcity of labor, for a majority of the States report their labor supply to be inadequate. The wages vary greatly in different parts of the country. They are highest on the Pacific Coast, where they average \$36.15 a month without board, and \$24.25 with board. The mountain States come next; then follows New England; while the lowest wages, \$14 and \$10, are paid in the South, which are, however, those for colored, as distinct from white labor.

The week in New York: Guns and drums; and yet business was quiet.

Toronto, as well as Halifax and St. John bankers, decided to accept United States silver certificates only at a discount. Canada has long wanted a pretext for excluding United States currency from circulation, silver and paper alike.

The war vessels in the Naval Review in this port represented 117,720 tons, of which the new navy of the United States comprised 39,793 tons, or a little more than one-third. Great Britain alone had 19,320 tons, represented in four vessels—nearly one-half the tonnage being in the "Blake."

Work on the Harlem River ship canal, designed to connect the East River with the Hudson, has so far advanced that a steam launch sailed through from Kingsbridge to Spuyten Duyvil during the recent flood. The stone bridge just commenced will cost \$348,000.

The Italian laborer, for shortness, calls shovel "shov." and hatchet "hatch."

How American trade with Venezuela has fallen off under the operation of a retaliatory policy is shown by our Consul at Maracaibo, who points out that in 1891 the exports of coffee declared in the Consulate reached the high figure of 43,118,760 pounds, of an invoice value of \$7,874,506 in gold, while during the year just closed the United States has received but 33,214,766 pounds, of a declared value of \$6,014,721.

Payments for the sugar bounty during the present fiscal year will exceed \$9,000,000. The total production of sugar in the United States for 1893 is estimated at 481,000,000 pounds, as compared with 378,000,000 pounds in 1892. The total beet sugar product is 27,000,000 pounds. The effect of the bounty is reported by the Government agents to stimulate the enlargement of factories, the introduction of new machinery and the enlargement of the capacity of existing establishments, but there has been little disposition to establish new factories.

The State of Washington is recognized by those who live there as possessing great resources, promising a grand development. In Tacoma, its principal port on Puget Sound, there are already 50,000 inhabitants, and in the State at large 120,000. A correspondent writes that nearly \$3,000,000 of building was done in Tacoma last

year, and he is informed that still more is projected for 1893. Another writer discourses with enthusiasm upon that great inland sea, Puget Sound, with its hundreds of safe harbors, "so deep that an ocean vessel can sail up to its shores and make fast to the fir trees that grow to the waters' edge." The people who are building up the country are reputed to be of more than the average intelligence of new settlers.

The onerous nature of the assessments to which strikers in labor organizations are compelled to submit is illustrated in a case cited by Eugene Debs, president of the new Western American Railway Union, who states that the Burlington strike cost the firemen \$500,000 and a loss of 7000 in membership.

The possibility of seismic disturbance in our great cities during the lifetime of some of the lofty buildings in course of construction cannot safely be disregarded by architects. The measure of responsibility which rests upon those who control these matters, Professor Shaler of Harvard, says, "may fairly be deemed grave." He remarks, further, that the occurrence of four earthquake shocks of importance in the last 300 years in the region along the Atlantic Coast makes it evident that from the point of view of the architect who would build in an enduring way, in a manner to insure safety, even in improbable contingencies, to those who dwell under his roof trees, this region is to be reckoned as anything but firm-set earth.

A Western man argues that the Government should appropriate money liberally for the artificial irrigation of the "American desert," instead of "bombarding the skies for rain, contrary to every known law of nature." The lowest parts of the "desert," as the arid region is popularly known, are supposed to abound in subterranean reservoirs.

That cotton mills in the South pay when properly managed is again attested by the annual report of the Graniteville Mfg. Company of Augusta, Ga., just submitted to the stockholders. The earnings of the company for the year ended March 1 were \$107,020.21. A 10 per cent. dividend, which is \$60,000 on the capital stock, was paid and \$42,000 were expended for new machinery and \$6000 for other improvements. This is regarded as a wonderful showing for the Graniteville and Vancluse mills of the Graniteville Mfg. Company. Vancluse was built at an expense of \$361,513.24 out of the profits of the Graniteville mill. The original capital was \$600,000. The total surplus, March 1, 1893, is represented by \$684,034.17.

There are no signs of the opening of the Sault Ste. Marie ship canal before another week.

Ohio's building and loan associations, as shown by the report of the State Inspector, represent the savings of people in moderate circumstances, which exceed \$74,000,000. This is over \$11,000,000, or more than 17 per cent. greater than the aggregate capital of all the banks in the State, national, savings and private. In Philadelphia there are more than 400 of these institutions, and as good an authority as the *Public Ledger* says that "it is conservative to state that building society people here own at least a \$2000 equity in 50,000 of the homes of Philadelphia."

It has now been decided to light the whole of the Southampton docks with electricity, while the cranes will be worked by hydraulic power.

Illinois has no statute forbidding labor on Sunday. Therefore the working unions have adopted resolutions for beginning their week's work on Sunday morning and

closing it on Friday night, so that they may visit the exposition on Saturday.

A London paper exhibits the photograph of a section of iron roofing which was struck by a hail cyclone in Australia, perforated by the hail as if it had been pounded with a hammer.

It is said in San Francisco that the Pacific Mail Steamship Company will soon make an Eastern connection via the Isthmus of Tehuantepec.

California's wheat prospects are unusually bright since the recent rains.

The States generally regarded as silverite holds even-eighths of their specie in gold. This is true of Colorado and Nevada.

In Australia the top wire of wire fences is utilized for the transmission of telephonic messages.

The claim has been erroneously made recently that Chicago banks had more gold in their vaults than New York, and therefore was the "financial center." The last official statement shows that March 1 New York banks held gold coin to the amount of \$57,000,000 and Chicago banks \$20,000,000.

The New York Dock Commissioners propose to build at least 20 granite piers this year on the North and East rivers, expending for this purpose in the work of construction and purchase of property, \$11,000,000.

The legality of the fifty-five hours labor law in New Jersey is to be tested by the Benjamin Atha & Illingsworth Steel Company of Newark, who have certiorated to the Supreme Court a case against them, holding that the act is not only in violation of the New Jersey Constitution, which forbids special legislation, but that it is also in violation of the Federal Constitution, because it abridges the rights of persons in the pursuit of prosperity.

West-bound freight rates from New York to San Francisco are reduced from 20 to 75 per cent. and over, embracing almost every commodity. This step is the beginning of the long threatened fight between the Southern Pacific Railroad and the new transcontinental freight line formed by the North American Navigation Company, the Panama Railroad and the Columbian Steamship line. The Southern Pacific people issued a new schedule of freight rates for west-bound business from New York to the California Terminals, which cuts under all figures previously quoted in the carrying traffic for the same distance.

The plant for a pumping station to supply South Side, Pittsburgh, with water from the Monongahela will cost about \$1,000,000. A large number of the iron mills have subscribed, as they claim the water used at present costs them thousands of dollars annually for repairs to the boilers and machinery. The river bank is lined with iron and steel plants from Chartiers to Brownstown.

Application has been made for a charter for an intended corporation to be known as the Mahoning County Ore Company of Youngstown, Ohio, with a capital stock of \$40,000. The object of the new concern is the mining of iron ores in Minnesota and elsewhere. James Neilson of the Andrews Brothers Company, of the Haselton Iron Works, Haselton, Ohio, is president, and the incorporators are Jos. L. Botsford of the Mahoning Valley Iron Company, Wm. J. Hitchcock and Frank Hitchcock of Andrews-Hitchcock Company, and Lucius E. Cockran, president of the Andrews Brothers Company.

# The Iron Age

New York, Thursday, May 4, 1893.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.  
CHAS. KIRCHHOFF, - - - EDITOR.  
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.  
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.  
JOHN S. KING, - - - BUSINESS MANAGER.

## Opening of the World's Fair.

In accordance with the set programme the gates of the World's Columbian Exposition were thrown open to the public on Monday. Appropriate exercises graced the event. The President of the United States pressed the button which started the ponderous machinery, and numerous distinguished representatives of American official life, as well as of foreign powers, added impressiveness to the occasion by their presence. The managers of the exposition were complimented for the ability and energy they had displayed in making the stupendous preparations necessary for the reception of a very large part of the best the world can show in mechanical and artistic achievements. The people of Chicago were especially proud of the fact that their city was the favored location for the four hundredth anniversary of the discovery of America, and welcomed to their midst the Duke of Veragua, the lineal descendant of the great discoverer. In the heart of the continent, almost 1000 miles from the seaboard, he beheld one of the greatest triumphs of civilization, the creation of gorgeous palaces, in which, in honor of his distinguished ancestor, the finest universal exposition was to be held.

Theoretically, the exposition is now in full blast and ready for the inspection of the people of the world. Practically, as shown in considerable detail elsewhere, the fair is not in proper condition to be visited and will not be for several weeks. Those who live within easy reach of it and can afford to visit it frequently will even now find a very great deal to interest them, and local patronage may run up to goodly proportions while the exposition is in its comparatively raw state. Residents of more distant localities, who can conveniently wait for a time and who do not expect to pay more than one visit to Chicago to see the exposition, will act wisely in deferring such a trip until late in May or perhaps in June. The exposition will be open for six months, and it should be seen at its very best in order to carry away the best impressions of its beauty as well as its magnitude.

We are not in sympathy with those who decry the exposition as a mere money-making scheme, with the celebration of the discovery of America as a pretext. This criticism could be made of every enterprise ever started and of every institution ever founded, save, perhaps, asylums, hospitals and churches. If it were not for the possibility of lucrative returns in some fashion human enterprise would be slow to engage in any undertaking, however pleasing it might be in contemplation. Expenditures in new schemes are not made if there is no

hope of financial profit. As well might a man refuse to avail himself of the conveniences of a railroad, on the ground that somebody built it to make a profit out of transporting him, as to scent a possible money-making scheme in connection with an exposition and decline to visit it on that account. The mingling of sentiment and business is not unnatural, but one is the ally of the other, just as Machinery Hall and the Fine Arts Palace both belong to and are indispensable parts of the Chicago Exposition.

As the Centennial Exposition in 1876 was of incalculable benefit to our people in stimulating their inventive and artistic faculties, causing wonderful progress to be made in the development of a higher order of productive activity, so may the Columbian Exposition of 1893 prove to be another powerful educator, imparting its stimulus just when new life is needed. The direction in which this will be shown cannot yet be indicated, but there will be thousands of visitors from every section of the country who have the quick eye, the retentive memory and the constructive faculty that will enable them to use to good advantage hereafter the lessons learned in a course of visits to the World's Fair this summer.

Let us all join in wishing the exposition complete success. Chicago's glory is the triumph of America.

## Our Consular Service.

The growing eagerness to secure a foothold in foreign markets for many of our goods has directed increasing attention to our consular service. The business community is being aroused to a realization of the wretched character of the organization. The first step toward reform must come through a frank exposure of its shortcomings, and these are now becoming painfully evident to a larger circle of influential and earnest men. No one who has traveled extensively abroad for business and few who have journeyed for pleasure only have escaped the conviction that the efficiency of the consular service is far below a reasonable standard. Many of our consuls are earnest, well-meaning men, eager to promote the best interests of our commerce, but even among them there are few who are thoroughly well equipped to carry out the best of intentions. A good many of our representatives, however, are men to whom no merchant or manufacturer would entrust even the responsibilities of a second-rate clerkship. Some of the trash which they send home by way of reports for the benefit of home producers is beneath criticism.

Even the most elementary requirement that the incumbent shall have at least a fair knowledge of the language of the country to which he is sent is disregarded. Appointments are made without any reference whatever to fitness for office, which, with few exceptions, is held only for a brief period. The service has its heavy percentage of bad and ignorant men, and suffers besides from the fact that the brief tenure of office displaces consuls who have acquired some experi-

ence by officers who must begin all over again.

In the majority of cases the pay is so miserably poor that the consuls must look to outside sources of income, with all the temptations to neglect of duty which that implies. Without hope of retaining office and practically none of promotion, the incentive to earnest and persistent work is lost.

When the business community thoroughly realizes what very important work can be done by a thoroughly competent, intelligent and industrious corps of consuls a complete reform of the service will be demanded, and will be ultimately obtained. It will be a very powerful factor then in developing and extending our foreign trade.

## Receivers and Combinations.

The suspension of the Pennsylvania Steel Company and of the Maryland Steel Company has brought before the steel trade in a conspicuous manner questions relating to the powers of receivers. The two companies named are members of the pool of steel-rail manufacturers, there being seven in all. In the trade the arrangement existing among them is generally understood to be as follows: Each company is allowed a certain percentage, or allotment, all being free to sell as much as they like, and at whatever price they may see fit to name, although there has often been an incidental, informal understanding on the latter point. At the end of each month each concern reports sales and shipments. The total of the latter is distributed according to allotment. Those who have exceeded their quota pay a tonnage penalty for the excess, which is distributed among those who have been below their share. In this way quite considerable sums have been transferred monthly, it having happened that concerns which were paying into the pool at one time in the year received money at other times.

On the whole, this plan has worked very well, although there have been irregularities, and although at times some efforts were made to invade the natural markets of others. The arrangement was to expire by limitation on April 1, but owing to the absence of some of the leading men in the different companies the discussion of a renewal of the arrangement was postponed to July 1. Since it was fairly satisfactory to all the leading interests, in spite of some recognized drawbacks, it was widely believed in the trade that a continuance was quite probable.

But now the association is confronted with serious questions, which possess an interest far beyond the narrower circle of the industry directly affected. Can a receiver of a manufacturing corporation become a party to any combination, the object of which is directly or indirectly to regulate the supply, or control the price, or to distribute the production of any commodity? We doubt whether a receiver would assume the responsibility, without strong backing in the way of legal advice, of entering into any such compact with other rival manufacturers. He might act in harmony with their arrangements and aims, which could only

be attained if the receiver commanded the absolute confidence of all rival producers. It will be readily understood, therefore, that there is a serious obstacle to the formation of a combination when the affairs of one producer are in the hands of a receiver, and that grave doubts as to the continuance of such arrangements arise when such a misfortune occurs during its existence.

The situation becomes more complicated still when periodic adjustments by the payment of money are a feature of the plan. A receiver, being responsible directly to the court for the administration of his trust, is not likely to pay penalties without express authority, which would not be readily granted. The denial of such authority would be fatal to the life of an association so constituted as to rest upon such a method of adjustment.

We believe that this is the first conspicuous instance in the iron and allied trades in which the questions alluded to have come up for consideration. It will be interesting to learn whether they can be met, and if they can, what method of procedure can be adopted to save an industry from relapsing into the disastrous condition of unrestrained competition. Consolidation by purchase outright or a reorganization allowing of the discharge of the receivers seem the only avenues of escape.

The unfortunate experience of the great Reading coal combination should operate as a timely admonition to all, in whatever line of activity, who would indulge in an inordinate ambition. A single year has been sufficient to resolve the huge would-be monopoly into its original component parts and to involve what remains in financial entanglements which the most astute can scarcely comprehend or rectify. The syndicate in control of vast coal-producing interests had an opportunity to gather in large profits for a considerable time to come, pending the tardy action of the courts arrayed to defeat their purpose, but in reckless disregard of all prudential considerations the effort was made to reach out, octopus-like, for the control of the coal traffic of the New England States. The failure that ensued was as signal as the design was audacious. If the Reading combination deemed itself invincible it was met by an aggregation of capital that soon dispelled the illusion. But some of the effects will be lasting.

The anthracite coal trade, it may now be presumed, will in future years be conducted substantially in accordance with former methods in this respect anticipating, in a sense, the condition attempted to be brought about through the enforcement of the Interstate Commerce law. Besides this, Reading's incursion into New England has precipitated a transfer and consolidation of railway properties calculated to bring about a permanent readjustment of important routes of traffic.

It is a somewhat surprising tribute to the progress made in the manufacture of basic steel that a leading engineer has come forward with a strong plea for the basic method for Sweden. E. G. Odel-

stjerna urges the manufacturers of that country to introduce the basic open-hearth if they do not want to see their famous steel crowded out of the markets by the basic steel of Germany, Austria and England. It seems that Swedish producers have been amazed by having old customers for billets complain of the high silicon contents of the steel, although it is identical with that furnished for generations. Metal with silicon as low as 0.07 per cent. has been rejected on that score. The customers want sound steel, but do not want it made sound by means of silicon at the sacrifice of quality. It is a queer phase of recent development that the makers of steel from the purest raw materials should be driven to adopt the methods of those who start with a relatively very inferior quality.

### PERSONAL.

John A. Potter, formerly superintendent of the Homestead Steel Works, Homestead, Pa., has recently been appointed mechanical engineer of the Pennsylvania Steel Company.

W. D. Rees, president of the Republic Iron Company, has been appointed treasurer of the Lake Superior Iron Company, with charge of their operations, succeeding Joseph S. Fay of Boston, who is retiring from active business. Mr. Rees will still retain his connection with the Republic Iron Company, and Harvey H. Brown & Co. will continue to represent the Lake Superior Iron Company as their lower lake agents.

F. E. Bachman has resigned his position as manager of the Salem Furnace, Salem, Va., and Mr. Maury of Max Meadows has been chosen manager. It is stated that the furnace will go out of blast as soon as the present stock is exhausted.

On April 30 Archibald N. Gore, for 18 years master roller at the Edgar Thomson Steel Works, Bessemer, Pa., severed his connection with that concern. On the evening of that day Mr. Gore was presented with a jeweled gold watch, chain and charm, and Mrs. Gore with a diamond ring by the Carnegie Steel Company, Limited. W. J. Evans, assistant roller, presented Mr. Gore, on behalf of his former employees, with a complete hunting outfit valued at \$500. Mr. Gore has retired from active business, and will make his home in the future on a farm which he has purchased in Lawrence County, Pa.

It is announced from Cincinnati that E. L. Harper, formerly well known in the iron and steel trade, has resumed business under the firm name of Harper & Co. Mrs. Harper, the wife, is announced as sole owner and Mr. Harper is general manager. The firm will deal in iron, steel and coke on commission.

It is announced that John Fritz of the Bethlehem Iron Company, Bethlehem, Pa., will be the recipient of the Bessemer medal of the Iron and Steel Institute this year.

Julian Kennedy, the well-known consulting and contracting engineer of Pittsburgh, recently delivered an interesting lecture on "Modern Steel Making" before the students of the Western University of Pittsburgh.

Walter Scranton, vice-president of the Lackawanna Iron & Steel Company, is recovering rapidly from the effects of his recent accident.

## CORRESPONDENCE.

### The Talbot Process.

To the Editor: One of the chief reasons the puddling furnace has been used so long in the manufacture of iron is because of its capability of using various irons of no fixed chemical composition. Whereas high silicon or high phosphorus would not give good results, yet a large variety of intermediate irons, within certain limits of a rather large range, are used to good advantage in the puddling furnace. In all the steel processes standard irons of definite chemical composition have to be used if satisfactory results are to be obtained. This is especially necessary in the Bessemer, and a hard and fast line is drawn as to the composition of the metal that is run into the acid or basic Bessemer converter for conversion into steel. More latitude is allowed in the open-hearth processes, as scrap can be used in the charge, which dilutes the impurities in the pig metal. In localities where scrap is scarce, when working on the basic hearth it is necessary to have a desilicized metal if economic results are to be obtained.

It is evident to all interested observers that the puddling furnace is rapidly going out of existence and has seen its best day. There is no doubt room for a modification of the basic process which will economically treat forge pig irons or any other silicious irons without having regard to exact chemical composition. The run of a blast furnace could then be successfully used without having to grade and select or reject, as the case may be. It would not then be necessary to cast the iron into pig beds, as liquid metal of irregular chemical composition could be used economically in the manufacture of steel. Standard irons of fixed chemical composition, whether for the acid or basic processes, are more expensive than intermediate irons of a wider range of impurities.

This condition applies to the Birmingham, Ala., irons, and led the writer to suggest the following process of desilicizing or standardizing their existing silicious metal, as being the best method for the preparation of their iron for economic steel manufacture. The process consists in utilizing the waste basic slag obtained from a heat of steel in its original liquid condition to desilicize and otherwise purify a succeeding charge of liquid pig metal. This slag contains a large percentage of base, both iron and lime, in the most favorable condition for the absorption of silica. The slag being extremely liquid and of very high temperature, no further fuel is necessary to liquefy it. It is found that a charge of desilicized metal when converted into steel will produce sufficient basic slag for a succeeding charge. This being a waste material, and being liquefied at no expense to the desilicizing process, therefore there is very little cost attached to the operation.

The slag is conveyed from the steel ladle and poured in a suitable vessel or furnace. Liquid pig metal is obtained from the blast furnace, receiver, or cupola, and poured in the bath of slag. Immediately the slag and metal come into contact with each other, a reaction occurs, and the silicon is rapidly eliminated, phosphorus being removed at the same time. A period of five to 15 minutes is ample to sufficiently purify the metal for subsequent treatment in the basic furnace or converter. Waste basic open-hearth slag contains 15 to 20 per cent. of iron and at least half of the iron is recovered and enters the charge as metal. The slag and iron being liquid, great heat is imparted to the metal, as much more heat is liberated by the oxidation of the silicon than is absorbed by reduction of oxide of iron to a metallic state.



The purified metal is exceedingly fluid, of a very high temperature, and so is easily handled without skulling or making scrap. The following tests, among others, were made at Birmingham, Ala., at the request of the Tennessee Coal, Iron & Railroad Company. Various grades of their irons were used, consisting of forge, foundry and silver gray, and in every case with satisfactory results.

Owing to the size of the furnace and other arrangements, only small charges of about 6 tons could be handled. The loss on these small heats was only nominal. The time occupied in working the cold desilicized metal into steel averaged from three to four hours. When it was charged hot in solid condition the time was considerably less.

Iron.		Slag	
Heat No.	Si. Phos.	Si.02 Silica Fe.	
2 Before treatment	2.68 0.95	10.84 44.58	
After treatment	0.07 0.76	33.42 17.03	
12 Before treatment	2.67 0.80	16.04 26.69	
After treatment	1.02 0.71	26.00 16.42	
13 Before treatment	2.75 0.80	17.48 26.28	
After treatment	0.38 0.45	25.40 14.60	
14 Before treatment	2.61 0.83	17.12 21.15	
After treatment	0.97 0.81	30.06 8.48	
15 Before treatment	2.79 0.67	18.87 25.75	
After treatment	0.40 0.44	32.58 12.92	
16 Before treatment	2.61 0.51	19.94 15.04	
After treatment	1.05 0.20	24.40 9.77	

#### Analyses of Steel.

Heats No.	Car. bon.	Sul- phur.	Phos.	Man.	Remarks.
12	0.06	0.045	0.031	0.30	Solid ingots
13	0.06	0.053	0.017	0.28	Solid ingots
14	0.05	0.063	0.044	0.19	Solid ingots

#### Physical Tests of Heat No. 11

Tensile strength per square inch, pounds	52,240
Per cent. elongation in 8 inches	30.00
Per cent. reduction of area	65.4

In speculating on further economies in Bessemer practice I think it may be possible the process of desilicizing can be advantageously applied. The inherent drawback to the Bessemer is that a portion of the charge of metal is oxidized and used to purify the remainder. This source of oxide is very expensive, since it must be calculated at pig iron price, plus other expenses in the Bessemer department. Oxide of iron obtained from a natural source is cheaper than that which is manufactured from metal. The oxidation of silicon in the converter imparts heat to the metal. Heat is also absorbed by the metal when the silicon is oxidized by the mixing of pig metal and fluid basic slag.

If the initial temperature is so increased by desilicizing outside the converter, so that the metal can be decarbonized in the vessel without excessive oxidation and poured into ingots without skulling, then there is some economy to be effected by its application. It would mean decreased waste, as the silicon would be eliminated at no cost to the metal itself and metallic iron would take the place of the expelled impurities. The time occupied by the silicon blow in the vessel would be saved, as the desilicizing of the succeeding heat would be effected in another vessel while the previous charge was being decarbonized in the converter.

This would result in blows of shorter duration, increased output and consequently a saving in fuel, labor, &c. If such a modification is practical, then perhaps the most important economy to be obtained would be that it would not be absolutely necessary to use standard Bessemer irons. Off Bessemer ores could be used, as an iron containing about 0.25 of phosphorus would, in the process of desilicizing, be reduced to at least 0.10 or under. In some localities this would mean a considerable saving in the manufacture of pig iron. Direct metal could be economically used if it did vary in its composition, as the result of passing it through the slag would effectively standardize it, so that regular work could be obtained from the converter. This would obviate the necessity of cupolas for re-

melting and mixing to obtain uniformity in the iron. High-silicon iron could be satisfactorily used and if it was found to be of advantage to retain in the desilicized metal 0.50 or 0.75 silicon to impart heat in the converter, this would not necessarily be difficult.

The following experiment with non-Bessemer iron was made by pouring the metal through a bath of slag. It will be observed that the phosphorus was reduced to standard limit:

	Phos- phorus.	Sili- con.
Before treatment	0.186	1.47
After treatment	0.107	0.04

I believe it is in some such lines as these—viz., decreased waste, &c.—that the most improvements will be made in Bessemer practice. In the open hearth attention will be given to the more economic preparation of the stock, so as it can be handled and charged expeditiously by machinery. This will cause a considerable saving in open hearth practice, and will bring the cost of the Bessemer and open hearth much nearer to each other.

BENJAMIN TALBOT.  
PENCYD, PHILADELPHIA, April 28, 1893.

## OBITUARY.

W. W. PITKIN.

William W. Pitkin, of the hardware firm of Pitkin & Brother, Fair Haven, Vt., died on the 19th ult. Mr. Pitkin's death was sudden and unexpected. He had been a sufferer for several years with kidney trouble, but it was not until a short time since that the trouble became so serious as to involve a suspension of labors. Mr. Pitkin was born in Poultney, Vt., January 22, 1829. He was educated in the public schools and at Burr Seminary at Manchester, from which he graduated. After his graduation he taught school for several terms in Castleton, and located in Fair Haven in 1852. Three years later he went to California, where he remained until 1859. Returning to Fair Haven he formed a copartnership with F. W. Moseley under the firm name of Pitkin & Moseley, for the purpose of conducting the Hardware business. Mr. Moseley sold out his interest in 1865 to John G. Pitkin, the firm name becoming Pitkin & Brother, which style has continued for the past 28 years.

EDWARD L. CLARK.

Edward L. Clark of Pittsburgh dropped to the floor unconscious at the entrance of the Fifth Avenue Hotel April 25 and died before a physician could be summoned. Mr. Clark was the senior member of the firm of William Clark, Son & Co., proprietors of the Solar Iron & Steel Works of Pittsburgh. He had been ill for about a year and last winter went South for his health. He returned North only recently and arrived in New York from Pittsburgh Tuesday morning on a business trip. Deputy Coroner Weston decided the cause of death heart failure. Mr. Clark was only 39 years old. He was the son of William Clark, the founder of the well-known iron and steel firm. He entered business with his father and became the head of the firm when his father died several years ago.

SAMUEL M'HOSE.

Hon. Samuel McHose, the first mayor of Allentown and builder of nearly all the blast furnaces in the Lehigh Valley, died at his home in Allentown, Pa., on the 21st ult., aged 78 years. A mason and bricklayer by trade, Mr. McHose early in life turned his attention to the erection of blast furnaces, and nearly every one of these establishments in the Lehigh Valley was built by him. Among them are the Thomas Iron Company, Hokendauqua, the Crane Iron Company, Catasauqua,

the Coplay Iron Company, the Lehigh Iron Company, Aineyville, the Allentown Iron Works and the Roberts Furnace, at Allentown, now the property of the Allentown Rolling Mills. He was the projector of the Roberts Furnace and was at one time an extensive stockholder. Mr. McHose also built several blast furnaces in New Jersey. In 1854 he and the late O. A. Ritter established the Allentown Fire Brick Works and were associated in business for 25 years under the firm name of McHose & Ritter. In 1861 he built and became one of the proprietors of the Hope Rolling Mill at Allentown. For the last ten years Mr. McHose has been engaged in the fire brick and fire clay business. In the former capacity he was connected with the Lehigh Fire Brick Works, Catasauqua, and in the latter with McHose & Hunt. The firm hold leases on extensive deposits of clay near Perth Amboy, N. J.

## Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., May 1, 1893.

The officers of the army and navy who visited the international rendezvous of fleets return with undisguised satisfaction over the showing which the American Navy made of the progress in modern war ships, hull, machinery and armaments.

Their experiences and the results of their observations have been the theme of interesting conversation at the department and in military, and naval and club circles.

They report that there is no occasion for any citizen of the United States to hang his head in humiliation when comparisons are being made in the future, as this Government can now boast of the best hulls, the best engines, the best armor and the best armaments of any ships of the same class owned by any country on the face of the globe.

The foreign officers were more than surprised at what they saw. The American fleet was a wonder to them. It seemed as if the creation of magic to the older officers who were accustomed to seeing the ancient wooden hulks which have been floating about the world under the American flag, even within the past few years.

They discovered a fighting power which they little dreamed of, and will doubtless reverse the notions of their home governments on nautical matters on the northern half of the Western Hemisphere.

The foreign officers spent much time on the American ships studying the mechanism and novelties of arrangement and construction. It is said that the American officers discovered nothing new on the foreign ships, or that had not been improved upon in the American ships of the latest construction.

The universal opinion among officers is that the moral effect of this gathering of vessels from the great nations will have an incalculable effect upon the advancement of the moral and physical influence of the United States. The \$600,000 appropriated for the manufacture of ordnance for the army for the fiscal year 1893-4 will push the work on coast defense and siege guns ahead very satisfactorily. Of the 23 10-inch guns now under way, eight are completed, and the balance are in various stages of advancement. The forgings are being made at Bethlehem, and the guns are assembled and finished at Watervliet. The contract for 100 8, 10 and 12 inch guns is also moving ahead rapidly. The gun plant at Watervliet is now in condition to turn out annually 12 8-inch, 15 10-inch, 15 12-inch and 3 16 inch guns, or a larger number of smaller calibers. The Ordnance Bureau is just now doing some active work in building gun carriages.

There are now completed an advance supply of carriages for 8, 10 and 12 inch guns and disappearing carriages and gun lifts; also mortar carriages of several standard patterns are being constructed. The ordnance officers are now waiting for the army engineers to locate the sites for these guns of high power, and they will be mounted.

If people imagine that the great harbors are in such a defenseless condition as the newspapers often assert, they will doubtless be surprised to learn that one of the best torpedo equipments in the world is now in existence in New York harbor and it is being constantly improved and extended.

#### A Patent Coke Drawer.

We recently made mention of the fact that a patent coke drawer would be tried at the Valley Works of the H. C. Frick Coke Company, in the Connellsville region. This new drawer arrived at the above works last week and was set up by J. E. Neave and W. J. Wight of the American Coke Drawer Company of Cincinnati, Ohio. The test made was considered fairly successful, but it is claimed more satisfactory results would have been obtained had the track on which the machine runs in front of the ovens been several inches lower. At the Valley Works 12 ovens were arranged with which to give the patent coke drawer a fair trial. The only change made in the ovens was a slight widening of the doors in front of the ovens. A standard gauge track was laid and on this the engine and machine were placed. The total weight of the drawer was 30,000 pounds. It is run by an automatic cut-off engine entirely inclosed in a dust-proof covering. The steam is made by a 30 horse-power upright tubular boiler. The fuel used is coke. The machine is worked by one man, who is seated between the engine and boiler, and manipulates a long rake or scraper with the aid of two levers. With the right-hand lever the rake is operated in and out, and with the left hand lever it is swung from one side of the oven to the other. The coke drawer is moved up and down the track by a foot treadle used as a throttle. On the end of the rake is a semi-oval cast iron shoe about 2½ feet in width and the same in length. Attached to the base of the shoe is an apron, which drops down when the coke is drawn as far as the door and allows it to fall into a shute. As much coke as will come through an oven door can be drawn with the shoe. The rake on the machine is run on a cog and travels at the rate of 150 feet per minute. At Valley it is arranged for a 12-foot oven, but can be made to suit any sized oven. As the coke falls from the oven it is caught in the cast iron shute, which is about 2 feet deep by 2 feet wide, and on the bottom of which is an endless belt of iron bars 3 or 4 inches wide. The shute extends 21 feet over all, and then 44 feet to the car on the yard track. Coke can be loaded by the shute 75 feet from the oven. Stock coke is piled on the yard by taking off part of the shute.

The patent coke drawer has few gears, and all are made of aluminum bronze to insure long wear and to guard against breakage. The water supply is carried in a tank in the center of the machine which has a capacity of 150 gallons.

At Valley two ovens were drawn, one in 19 and one in 17 minutes. This is less than half the time that the work can be done by hand. At Cincinnati, where the new machine is in operation, 30 ovens are drawn daily at an average of one every 15 minutes. There seems to be only one objection to the patent drawer. No select coke can be loaded unless stocked and then picked. There is an advantage, how-

ever, which partially offsets this objection. But very little coke is lost in the cinders, and the average run of the coke will not be broken as fine as if drawn by hand.

#### San Francisco News.

There is a strong movement among our manufacturers in favor of admitting certain raw materials duty free, and this movement is now presenting a formidable front. It has taken the form of a petition to the Chamber of Commerce to cast its influence in favor of the admission, duty free, of iron ore, coal, coke, pig iron, scrap iron and scrap steel. The petition has been signed by 160 iron and steel manufacturing firms on the coast. It goes on to say that the trade of the coast was in a deplorable condition. Owing to the poor quality of local coal they were compelled to import fuel for smelting purposes, and that this imposed a special tax of 75 cents a ton on manufactured iron, while coal interests were not benefited. They were compelled to import a large per cent. of scrap iron and steel. The document sets forth that the indorsement of the petition by the Chamber of Commerce would result in great benefit to the iron and steel industry. After considerable debate and considerable opposition on the part of a few members, the document was referred to a committee to report. That committee has not yet reported, but there is little doubt that it will do so favorably. This is quite a change from even the state of feeling a very few years ago. Then such a resolution would not have had the smallest chance of passing. The tax paid for foreign coal exceeds half a million dollars a year. In 1892 there was entered at this port from foreign countries—British Columbia and Australia particularly—in all 1,015,854 tons. The lack of cheap coal has always been a great drawback to our manufacturers. When Australian coal gets down to \$6.50 per ton it is considered cheap. This will help to give Eastern manufacturers an idea of the obstacles that stand in the way of their Pacific Coast brethren. Of course, Eastern manufacturers have the advantage of much cheaper raw material as well as much cheaper coal—pig iron, for instance, being \$6 to \$8 a ton more here than it is in New York. This would be about offset by a repeal of the duty, so that our manufacturers and those of the East would be placed on a reasonably fair level of competition. This would at once give rise to the establishment of many flourishing industrial establishments among us; in fact, I feel that I am within bounds in saying that in less than two years the output of our foundries, machine shops, shipbuilding yards, &c., would be increased twofold, while there would be a steady increase every year in the future, and that thousands of industrious workers would be added to our population. Then San Francisco manufacturers in these lines would have the whole coast open to them, to compete, instead of as now being restricted to a comparatively limited area. The value of the output of all of our industrial establishments in this line is usually estimated at from \$4,000,000 to \$5,000,000 a year, so that we have a prospect of seeing an industry of at least \$10,000,000 annually established here in the city if the people at Washington will only look at the matter from the same standpoint as do those interested here. And our manufacturers feel very sanguine, from the temper of the incoming Congress, that the prayer of the petition will be acceded to. We have one of the best shipyards and one of the best rolling mills in the world, and we turn out very good bar iron and steel, and only need a little encouragement to rise from that slough of despond in which we have been

plunged by continual strikes and bad times. So much for the movement which is about to be reinforced by so numerous and wealthy a following.

The iron and hardware markets as well as all others continue to improve very slowly indeed. The rains and the inclement weather are about sufficient to account for this. The fact that there is yet, according to fair estimates, 18,000,000 bushels of wheat in warehouses in the State is one reason why business has been dull, as all this has usually been sold long before this time.

Pig iron keeps in its usual state of dullness at a range of \$19 to \$23 per ton. There is no change in the price of tin plate, which is now given at \$6.10. Pig tin is in light demand at 22 cents per pound. Hardware is selling slowly at no perceptible change in prices. Nails are still quiet at former prices. We continue to receive considerable supplies of Eastern nails by clipper.

#### New Publications.

SEWAGE TREATMENT AND SLUDGE DISPOSAL. By W. Santo Crimp M. Inst. C. E., F. R. M. S., &c. Engineering Record office, London, 1893.

The most effective method for treating and disposing of sewage, or the fouled water supply of a community, with the least detriment to health, while utilizing the substance for fertilizing or other purposes, is a matter which has received much attention from sanitary engineers and chemists of late years. In a pamphlet on this subject, W. Santo Crimp discusses various methods adopted for the disposal of city sewage in various parts of England. London, which long suffered by the pouring into its river of the liquid refuse of generations, has now a system by which the city's sewage is conveyed by long distance pipes into the sea. But this is by many considered to be a waste of material, which might be utilized and made of value, as is the case in Birmingham, where the solid matter is extracted and dug into the ground as a fertilizer. As about 4 tons of dry solids, valuable for this purpose, can be extracted from each million gallons of sewage, when clarified by means of chemicals, this item appears to be an important one. Mr. Crimp's treatise contains a good deal of interesting and useful information, and as a contribution to our general knowledge on that important question of the day—the utilization of waste—it has considerable value. The author inclines to the opinion that the treatment of sludge, or the solid matter precipitated from liquid sewage, by means of lime and a filter press, which converts the substance into dry cakes, possessing valuable fertilizing properties, is the most efficacious and economical way of dealing with such refuse. This method is in successful operation in several English towns.

MINES AND MINERAL STATISTICS OF THE STATE OF MICHIGAN. James P. Edwards, C. E., Commissioner of Mineral Statistics, Lansing, 1892.

The first report of Commissioner Edwards on the mines and mineral statistics of the State of Michigan for the year 1891 has, as stated by that officer in his introduction, been compiled under difficulties, owing to the fact that many mines have neglected or refused to report on the blank furnished; and as no penalties are fixed for such refusal, it has been impossible for the commissioner to enforce his demand for information. Mr. Edwards strongly recommends that a law should be passed to obviate this difficulty in future, and also to fix a uniform time for the rendering of annual reports by mining com-



panies. Nevertheless, a large amount of valuable information regarding the mineral products and resources of Michigan has been collected and presented in this annual report. Copper, naturally, holds the most prominent place; and we learn that the situation is that metal was one of constant solicitude during the year, particularly to the smaller mines, owing to a steadily falling market. On the whole, however, Lake Superior fared well, with an average price of 13 cents for the 12 months. No particularly new devices were introduced for the advancement of copper mining, although all the larger plants were improved. Much of the copper range yet remains to be explored, and it is the opinion of Commissioner Edwards that money, modern appliances and proper management are all that is required to place the district among the most profitable copper producing countries extant. Among the varied mineral resources of the State are reckoned iron, coal, gold, silver, salt and sandstone. The mining and exploration for gold in 1891 were not very successful, although some new "finds" were made of a promising character; of coal, the record is the lowest in any year since 1877, many of the old mines having been exhausted; but salt makes a good showing, 80,034 barrels more having been inspected than in 1890.

**HANDBOOK OF THE AMERICAN REPUBLICS,** No. 3. Bureau of the American Republics, Washington, D. C., January 1893.

The present handbook is presumably intended as a Columbian edition, from its size and general get-up. It is a bulky volume of 600 pages, enriched by a number of maps and illustrations, and containing a very large amount of statistical and general information in regard not only to the Republics of Central and South America, but also to the foreign colonies on the Continent and the West India Islands, as well as the Hawaiian Islands. To merchants and manufacturers looking for foreign trade the information respecting customs tariffs, local regulations, commercial treaties and the resources, products and commerce of the various countries cannot but be of great value. The volume also contains comparative tables of weights and measures, steamship, cable and postal information, and a section devoted to the World's Columbian Exposition.

**ELECTRICITY UP TO DATE.** By John B. Verity, M. Inst. E. E. Frederick Warne & Co., London and New York, 1893. 75 cents.

This little work presents in a popular form the achievements of electrical science in its various branches up to recent date. It treats of the production of electricity, the dynamo and its principle and other cognate subjects. Chapters are devoted to electricity as an illuminant, a transmitter of power, a motive power, &c., while a new and interesting subject taken up in this edition is that of electro-therapeutics. In the paper on this topic distinctions are made between the genuine results of electricity as applied to the healing art and the numerous quack appliances and methods lately put forth for curative purposes under its name. A useful feature of Mr. Verity's book is the glossary of electrical terms, many of which are so puzzling to the layman. In view of the rapid manner in which new developments of the science of electricity follow one another in these days, it would appear that constant revision will be necessary in order to justify the title of this book. It may be mentioned that this is the third edition, and that it is brought down to January, 1893. No reference is made in it to cooking and heating by electricity. It appears that these subjects have been omitted pending some experiments on their cost. The book, however, presents a good idea of the ground now covered by the great

modern medium, which, by the way, is asserted by Mr. Verity to have been known to the civilized world at least 2000 years ago, even if the ancient Egyptian mysteries and the arts practiced by the wise men of the East long before that time were not due (as has been conjectured) to their knowledge of electric phenomena.

**PATENTABLE INVENTION;** by Edward S. Renwick, civil and mechanical engineer and expert in patent causes. The Lawyers' Co-operative Publishing Company, Rochester, N. Y. 1893.

Mr. Renwick, the author of this work, is one who is, presumably, well qualified to compile such a text-book. A solicitor of patents of over forty years' experience and an expert in patent causes, he is, moreover, a practical engineer and an inventor himself. Consequently he should be better equipped for the work of a guide in patent matters than the majority of mere jurists who have written upon the subject. His work is divided into three sections, treating respectively of patentable invention; invention patentable by law; and invention patentable in a reissue patent. These subjects are treated more from the point of view of the inventor and are illustrated by numerous typical cases which have been adjudicated by the courts. Considering the somewhat unsatisfactory nature of the present patent laws and the diverse decisions of courts as to what constitutes invention, such a work as that of Mr. Renwick will be useful as a common-sense guide to the inventor who wishes to steer clear of vexatious delay and loss in getting out his patent with possible expensive litigation to follow. It is unencumbered by puzzling legal phraseology so far as possible, and is generally "understandable of the people."

"ARTS AND CRAFTS" is the name of a new monthly magazine published by the Art Worker's Guide of Philadelphia, and devoted to the cultivation of the arts, to fostering a fraternal spirit among art craftsmen and to safeguarding their interests. The first number comes to us well printed, with four wood-engraved supplements and a copper plate etching by Peter Moran, president of the Philadelphia Society of Etchers, 7 x 10, subject, "Springtime." The magazine is edited by H. Bloomfield Bare, and should prove a welcome addition to the literature of art workers.

**MINERAL RESOURCES OF THE UNITED STATES.** Calendar year, 1891. David T. Day, Chief of Division of Mining Statistics and Technology. United States Geological Survey. Washington: Government Printing Office. 1893. 50 cents.

The eighth volume of the series "Mineral Resources of the United States," shows the progress made in the production of minerals during the year 1891, and covers the same range of subjects treated in previous reports. The statistical data are brought down uniformly to December 31, 1891, but much of the descriptive matter is of a later date. The minerals reported on include metals, fuels, structural materials and miscellaneous or non-metallic substances. Except in the case of pig iron and iron and steel manufactures, the production of minerals in 1891 shows a general, and, in many cases, a remarkable increase over the year 1890. The reports on various minerals are from the pens of well known authorities. Iron ores are treated by John Birkinbine; coal, by E. W. Parker; copper, lead and zinc, by C. Kirchhoff; coke, petroleum and natural gas, by Joseph D. Weeks; clay materials, by Robert T. Hill; precious stones, by George F. Kunz, &c. James M. Swank contributes a valuable report on "Twenty Years of Progress in the Manufacture of Iron and Steel in the United States."

## MANUFACTURING.

### Iron and Steel.

The new machine shop for the Eastern Forge Company of Portland, Maine, will be designed and built by the Berlin Iron Bridge Company of East Berlin, Conn. The building will be 57 feet in width and 150 feet in length, and will be entirely of brick and iron, with all modern improvements.

The large furnace at Embreeville, Tenn., which has been out of blast for some time on account of the dullness in the iron trade, is making preparations to resume operations, and the Carnegie Furnace, at Johnson City, Tenn., will also go into blast at an early day.

The Victoria Furnace, at Goshen, Va., was blown in last week, and is working very satisfactorily. A large amount of ore has been uncovered on the lands of the company, and they regard the outlook for the successful operation of their plant as very encouraging.

The 50-ton charcoal furnace at Forty-eighth Post Office, Ashland, Tenn., has been completed and was put in blast April 28, and it is stated that another furnace will be put in operation early in May. This furnace is the property of the Southern Iron Company.

Olive Furnace of McGugin & Co., at Olive Post Office, Ohio, has been blown out for relining and repairs. As soon as these are completed the furnace will go in blast again.

A reduction of wages has been ordered in the universal mill at the Pennsylvania Steel Works at Steelton. Several months ago, in order to fill pressing orders, the men were taken from day wages and put on tonnage, since which time the capacity of the mill has almost doubled, the salaries ranging from \$100 to \$175 per month. This reduction, it is claimed, will put that department on an equal footing with other similar work.

The Pottsville Iron & Steel Company of Pottsville, Pa., large makers of beams, channels, &c., are making considerable improvements in their yards for the rapid and economical handling of their stock. They will use the Ridgway steam-hydraulic cranes. These cranes will cover a circle of 72 feet each and by their use one boy will in an instant do the work now requiring a large force of men for a considerable time. The cranes will also weigh the stock as well as handle it in a rapid manner.

The Hecla Furnace of the Hecla Iron & Mining Company, Ironton, Ohio, is idle at present, undergoing extensive repairs. These will be completed about June 1, at which time the furnace is expected to resume blast.

The Bloom Furnace of Clare Iron Company, at Bloom Switch, Ohio, which has been undergoing repairs for some time, will resume blast at an early date.

The John Peters Iron Company have been organized at Ironton, Ohio, with a capital of \$30,000. The new concern will manufacture pig iron.

The Kilmer Mfg. Company of Newburg, N. Y., increased their capital stock on the 18th ult. from \$300,000 to \$500,000. The increase of \$200,000 is being sold at par value, and a large amount has already been taken. This increase of capital stock will not in any way affect the management of the company, which remains in charge of the former officers, the additional capital being rendered necessary in order to meet the largely increased demand for their special quality of wire rods, barbed wire, bale ties, &c. The mill is now run to its full capacity, and is inadequate to meet the demand. It is their intention to make extensive improvements immediately, so as to be in position to supply their increased trade.

At Cambridge, Ohio, J. D. Taylor and others will at once begin the building of the Guernsey Rolling Mill, and the Cambridge Iron & Steel Company are beginning to build an extensive galvanized sheet-iron plant.

It is thought that the new furnaces of the York Iron Company now building at Superior, Wis., will be ready to begin operations by the middle of August.

Olive Furnace, in Lawrence County, Ohio, has gone out of blast for the purpose of putting in new lining. On the other hand, however, Bloom Furnace is getting ready to resume in a few days, and will be followed about June 1 by Centre and Hecla. All these furnaces are located in the Hanging Rock region.

The Nova Scotia Steel & Forge Company of New Glasgow, Nova Scotia, are one of the leading iron and steel manufacturers of the Dominion and are equipped with the best and most modern machinery. Donald Fraser, the president, has recently been in this country contracting for some further labor-saving machinery, among which is an outfit of the Ridgway steam-hydraulic cranes, which are now being built by Ridgway & Son.

The Toledo Bridge Company of Toledo, Ohio, is putting up an additional building 250 x 90 feet, which will be equipped for turning out all kinds of heavy iron building material. Heretofore the company have confined themselves to bridge work alone.

At the annual meeting of the stockholders of the West End Rolling Mill Company, Limited, and Chain Works, held recently at Lebanon, Pa., the following officers and directors were elected for the ensuing year: President, J. Henry Miller; superintendent, John R. Evans; secretary and treasurer, H. M. Capp; directors, J. Henry Miller, John R. Evans, Jacob Capp, George R. Ross, H. M. Capp, C. Shenk, H. P. Moyer. A 6 per cent. cash dividend was declared and 6 per cent. placed to the surplus account. Owing to the enlargement of the works and the improvements being made by the company, it was decided to increase the capital stock and sell a limited number of shares. The works are at present running to their full capacity.

Ground has been broken at Alliance, Ohio, for the new plant of the Reeves Bros. Iron Company, who will remove their works to that place from Niles as soon as the buildings are completed.

The stockholders of the Wellman Iron & Steel Company, Thurlow, Pa., elected the following officers at their annual meeting held recently: President, S. T. Wellman; secretary, Richard Peters, Jr.; treasurer, J. H. Roop; vice-president, S. H. Chauvenet; directors, S. T. Wellman, Richard Peters, Jr., J. H. Roop, S. H. Chauvenet, S. A. Crozer, John H. Converse, George P. Crozer and William Burham.

At the Norton Iron Works, Ashland, Ky., the four hot-blast stoves are being remodeled and other improvements carried through which it is expected will lead to an enlarged furnace output.

Wm. Swindell & Brothers, engineers and contractors, of Pittsburgh, have just completed the erection of a 30-ton air furnace for Seaman, Sleeth & Black, proprietors of the Phoenix Roll Works, at Pittsburgh, making the sixth furnace of this kind erected for this firm. Swindell & Brothers have also completed a 15-ton air furnace for the Apollo Foundry Company, at Apollo, Pa., and have one 15-ton air-furnace in course of construction for the Farrel Foundry & Machine Company, at Ansonia, Conn.

The Cherry Valley Forging Company of Leetonia, Ohio, have commenced to cut car axles, the first being cut this week. This company have been accustomed to burn slack in the puddling furnaces, but have now commenced to use block coal, expecting thereby to get better results.

The Mahoning Valley exhibit at the World's Fair is one of the most complete assortments of iron and steel ever collected from one district. It comprises samples of merchant bar, tee iron, angles, hoop iron, cotton tie and all rolling mill product, as well as a nice lot of Bessemer, foundry and mill pig iron of all grades, and samples of washed metal. The exhibit was gathered by the Mahoning and Shenango Iron Manufacturers' Association and was shipped from Youngstown last week.

At the Pomeroy Rolling Mills, Pomeroy, Ohio, operated by Cartwright, McCurdy & Co., Youngstown, Ohio, the record for production of cotton ties in one day was broken on Tuesday, the 25th ult. On that day the 8-inch men went to work at 5 p.m., going off the next day at 4 a.m., and made in the turn's work 690 bundles of cotton ties of 45 pounds each. The 7-inch men then went on at 3 p.m., and when the turn closed the next day at 2 a.m. the output was 766 bundles.

One of the Crown Point furnaces, at Crown Point, N. Y., goes into blast during the present week.

Boiling Springs Furnace, situated at Boiling Springs, Cumberland County, Pa., is now in full blast, turning out a strictly cold-blast charcoal iron. Foreign ores are used as a basis, and a chilled roll iron is produced, chilling from  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches. It is high in tensile strength and runs below 1 per cent. in silicon. The company's output of Nos. 1 and 2 iron is sold ahead for one year.

#### Machinery.

The Pittsburgh Locomotive Works, Allegheny, Pa., have received an order from the Kansas City, Ft. Scott & Memphis Railroad for the construction of 14 locomotives.

A charter has been granted to the Second Avenue Traction Company of Pittsburgh with a capital stock of \$1,000,000. The company have been organized for the construction and operation of motors and cables or other machinery for supplying motive power to passenger railways. The directors are as follows: James D. Callery, William J. Burns, John C. Reilly, W. V. Callery, George C. Wilson, W. H. Keech and John W. Taylor.

The Pennsylvania Machine Company of Philadelphia have just booked an order for an 8 horse-power portable engine, mounted on wheels and fitted with whiffletrees and yokes for four pairs of oxen, to be shipped by the American line to Monrovia, Liberia. This is the first shipment made by this concern to that country, and it is expected that it will lead to other business. The company are meeting with considerable success in the introduction of their patent journal box. Several manufacturers of high-speed machinery have taken out licenses to manufacture and place it on their machines. The Buss Machine Company of Chicago and the John A. White Company of Andover, N. H., will have the journal box exhibited on their machines at the World's Fair.

The Kellogg Iron Works in Buffalo were damaged \$10,000 by a fire that broke out in the adjoining premises.

The Birmingham Foundry & Machine Works, Birmingham, Ala., are at present making engines for dredging Mobile Bay. The Government has appropriated about \$200,000 to this improvement, and the Birmingham company secured the contract for the engines.

In certain quarters it is reported that the Union Switch & Signal Company of Pittsburgh have secured as much business thus far in 1893 as they did during the entire year of 1892.

An order was made in the United States Circuit Court at Pittsburgh last week fixing May 16 for an argument on a motion for an injunction in the case of the Stirling Company of Chicago, manufacturers of the Stirling boilers, against the McKeesport & Wilmerding Railroad Company, the Pierpoint Boiler Company and the Fuel Gas & Mfg. Company of Pittsburgh to restrain the defendants from using boilers containing a patented appliance claimed by the complainants.

The Akron Steam Forge Company of Akron, Ohio, are drawing up plans for the new plant which they propose to erect at Elwood, Ind.

White, Warner & Co. of Taunton, Mass., have begun the building of a new foundry, 100 x 50 feet, and a storehouse, 34 x 40 feet.

The stock of the L. M. Rumsey Mfg. Co., St. Louis, Mo., consisting of steam pumps and brass and cast-iron machinery, has been damaged by fire and water to the extent of \$100,000.

The Marshall Car Wheel & Foundry Company of Marshall, Texas, will soon break ground for a new plant at Houston, Texas. The new works will be operated as a branch, and operations at Marshall will continue as before.

The Cooper Point Iron Works at Camden, N. J., have been burned, causing a loss of \$15,000.

The Phoenix Iron Works Company have removed their Chicago office from 418 Chamber of Commerce to 519 The Rookery.

The Lloyd Booth Company, Youngstown, Ohio, have received an order from the Colorado Fuel & Iron Company, at Pueblo, Col., for a large bar-mill shear, and have also received an order for two bar-mill shears from the Minneapolis Rolling Mill Company of Minneapolis, Minn. A large scrap shear was shipped by this firm last week to East Chicago Iron & Steel Company, at East Chicago, Ind.

#### Miscellaneous.

The Quaker City Electric Company of 940 North Ninth street, Philadelphia, have just installed an electric lighting plant at the works of J. H. Sternbergh & Sons, Reading. They have also installed a plant for the Philadelphia Packing & Provision Company and are starting a large plant for C. Stegmaler of Wilkes-barre, Pa. The company are preparing to place upon the market an arc motor which they claim will embody some new and interesting features.

John H. Dialogue & Son of Camden, N. J., are said to be coming to the fore in the construction of iron vessels. A few days ago they launched a fine steam tug which has been built at their yard for J. E. du Bignon, Brunswick, Ga. She is a steel vessel, 110 feet long and 21 feet in beam, drawing  $11\frac{1}{2}$  feet of water, and is fitted with all the latest improvements.

The Niles Spouting & Roofing Company of Niles, Ohio, have been granted a charter of incorporation, with a capital stock of \$10,000.

The annual meeting of the stockholders of the Youngstown Bridge Company was held at Youngstown, Ohio, last week; the following Board of Directors being elected: James Neilson, Hamilton Harris, Andrew Milliken, J. H. Thompson, E. D. Haseltine, L. E. Cochran and J. P. Kennedy. The directors did not organize, but will hold a meeting at an early date for that purpose.

The Peerless Foundry Company, recently incorporated, have commenced business at

Alter street, near Twentieth street and Washington avenue, Philadelphia. They occupy a brick building 60 x 90, employ 11 men and have a capacity of about 2 tons of small castings per day. Their particular lines are hardware castings and parts for sewing machines, typewriters, &c. They claim to have especial facilities for turning out castings requiring intricate core work. The company are composed of seven practical molders.

The Belmont Iron Works of Twenty second street and Washington avenue, Philadelphia, have just completed a large iron foot bridge and staircases for the exhibit of the Pennsylvania Railroad at the World's Fair. The shipment was made in three carloads.

The Cleveland Bridge Company, Cleveland, Ohio, have been granted a charter of incorporation with a capital stock of \$10,000. The new concern will engage in the construction of bridges and other structures and will do a general constructing business.

The Warren Hardware Company, successors to Kirk, Christy & Co., Warren, Ohio, manufacturers of the Warren Steel Range, have recently declared an annual dividend of 6 per cent. The above concern have decided to make some additions to their plant which will considerably increase their output of steel ranges. Two smaller sizes have been added, which will be ready for the trade about the 15th inst.

Among recently authorized corporations in Illinois are the following: The Krabel Palace Car Company, Chicago; capital stock, \$10,000,000; for the manufacture of railroad coaches and cars, and all kinds of railroad specialties and supplies; incorporators, William E. Schrader, Howard A. Baldwin and Frank B. Redington. Brown Nut Lock Company, Chicago; capital stock \$600,000; for the manufacture of railway appliances; incorporators, Julius C. Brown, J. C. Le Masters and James W. Wilson. The Weber Brothers' Metal Works, at Chicago; capital stock, \$30,000; for the manufacture of sheet-metal articles; incorporators, Charles F. Weber, William J. Weber and William Rochlitz. The Chicago Sanitary Vertical Trap Company, Chicago; capital stock, \$150,000; incorporators, Joseph Obyne, John F. Mahon and Joseph Mahon. The Safe and Timeclock Company, Chicago; capital stock, \$200,000; incorporators, N. B. Rees, J. W. Kenevel, Calvia C. March and George F. Probst. The Stiles Tin Company of Chicago; capital stock, \$200,000; for the manufacture of Tinware; incorporators, William Patte, Stephen Stiles and Henry Stiles. The Automatic Time Stamp Company, Chicago; capital stock, \$150,000; for manufacturing; incorporators, Warren B. Martindale, John M. Stebbins, Walter B. Pelton and Charles H. Tallmadge. The United States Improved Stove Board Company, at Chicago; capital stock, \$30,000; for the manufacture of stove boards; incorporators, Richard J. Hawes, David Goldberg and Jesse Lowenhaupt. Griffin Wheel Company, at Chicago; capital stock, \$1,250,000; for the manufacture of car wheels; incorporators, Thomas A. Griffin, Gardner C. Willard and William W. Evans. Metropolitan Electric Engineering Company, at Chicago; capital stock, \$50,000; for the manufacture of machinery and electric motors; incorporators, Francis J. Dommergue, Charles H. Fleischer and Joseph Staab. Turnbull & Culbertson Metal Lath Company, at Chicago; capital stock, \$50,000; for manufacturing and contracting; incorporators, George A. Turnbull, E. F. Culbertson and N. H. Hanchett. John F. Alles Plumbing Company, at Chicago; capital stock, \$60,000; for manufacturing and repairing plumbing; incorporators, John F. Alles, Joseph W. Alles and Warwick A. Shaw. Killmer Mfg. Company, at Chicago; capital stock, \$50,000; for the manufacture of water filters and novelties; incorporators, Louis J. Pierson, Edward M. Burst and W. N. Woodson. Tilton Sewing Machine Company, at Chicago; capital stock, \$50,000; for the manufacture of sewing machines, equipments and supplies; incorporators, Joseph H. Tilton, Victor T. Elting and J. E. Fay. The Goltra Steel Company, at East St. Louis; capital stock, \$1,500,000; for a general foundry business; incorporators, G. J. Root, R. J. Whitney and Edward F. Goltra.

The office building of the Benedict & Burnham Company, at Waterbury, Conn., has been damaged \$20,000 by fire.

The Lamokin Car Works Company of Lamokin, Pa., contemplate the erection of an additional shop 274 x 103 feet in size.

No. 1 Wire Mill of the Spencer Wire Company, at Spencer, Mass., has been destroyed by fire, the loss being \$10,000. It will be rebuilt.

The Capital Sheet Metal Company of Columbus, Ohio, capitalized at \$100,000, have been incorporated. The object is to manufacture sheet-metal products and carry on a general manufacturing business at Columbus. Operations will begin at once.

# TRADE REPORT

In nearly all departments of the Iron and Steel trades a very conservative attitude is maintained by buyers both of raw material and of finished product. In some branches in which season contracts are the feature a disposition is developing to hold off so far as purchases for distant deliveries are concerned. It is on the whole a very fortunate matter that there has been no inflation whatever, so that the present condition of affairs finds the majority of producers and merchants in a pretty snug condition.

Negotiations in the Lake Superior Ore trade have not yet come to a head, although it is intimated that buyers have receded somewhat from the extreme position which they occupied until recently. It is reported that they are now willing to go as high as \$3.75 for Standard Gogebic Ore.

In the Heavy Steel trade the markets throughout the country are very quiet. Sales of Rails are light, East and West. In Billets, the Pittsburgh and Wheeling districts have had a very quiet week, with Steel for early delivery offering at \$21.75, while later deliveries are \$21.50. In the Eastern markets the pressure to sell from the West is being again felt, and prices are declining to a figure closer to buyers' views.

Bessemer Pig in Pittsburgh has been very dull, and has eased off to \$13.40.

Nearly all the leading distributing markets for Foundry Iron record a very quiet state of affairs, and yet prices are quite stubbornly held by producers of well-known Irons. The conviction is gaining ground that there is practically no room for further concessions of importance without causing a marked restriction in current production. As it is, the prospects for the summer are so discouraging that there is no inducement to hang on in the hopes of an early turn for the better.

While Bars are quite active in Western markets the mills in the East are complaining, and some of them are cutting prices very low to secure business. Some season contracts for Soft Steel have been placed in Chicago and Pittsburgh, and some are now in the market. Other buyers have withdrawn for the present.

The demand for Structural Iron and Plates is slow, considering the season, and prices are at a very low ebb. The large contract in New York, to be given out this week for Plates, may help that specialty.

A 16-mile order for 10-inch Pipe for natural gas at Indianapolis has been captured by an Eastern concern. Another large contract is pending.

The event in the Metal market has been the closing of negotiations with consumers of Copper for a large quantity of Metal for forward delivery, the amount involved being stated to have been 15,000,000 pounds. The exact terms have not yet been divulged.

Lead has eased off, while Spelter took a temporary jump under the stimulus of a threatened strike among the Kansas coal miners. Our St. Louis correspondent telegraphs that the trouble has been adjusted.

## Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, CHICAGO, May 3, 1893.

The opening of the World's Fair on Monday was celebrated by a holiday, which was very generally observed. The interruption to business was not serious, as the condition of all branches of trade just now is such that even more holidays could be taken without causing any great injury. The market has been quiet and without special change.

**Pig Iron.**—The molders' strike in this city continues, but there are indications of its early termination. Quite a number of the molders employed in some of the principal foundries have resumed work at the old terms, and it is expected that in a few days the remainder will follow suit. The Pig-Iron dealers have found their trade interrupted to some extent by the strike, but not so much as would have been supposed, as the strike is purely local. Coke Iron has been generally quiet, but a few transactions of 1000 tons or more have been closed, so that the volume of business for the week was quite fair under the circumstances. The greater part of this business was in local Irons, Southern Coke being neglected. The Southern companies appear to be working into better condition, as there is some difficulty now in securing prompt deliveries on old contracts. Prices are unchanged, there still being a few concerns willing to sell at the concessions which have been current for the past month. Ordinary quantities are moving at our quotations. High grades of Lake Superior Charcoal Iron, say Nos. 4 to 6, are quite scarce. Inquiries for these grades are coming in from Car-Wheel concerns, and efforts are being made to weaken the market, but makers are firm. Large consumers are figuring on considerable quantities and orders are in sight for quite a tonnage, but it may be some time before transactions are closed, as there is considerable difference of opinion between buyers and sellers on the question of price. Quotations are as follows, cash, f.o.b., Chicago:

Lake Superior Charcoal.....	\$16.50 @	\$17.00
Local Coke Foundry, No. 1.....	13.75 @	14.25
Local Coke Foundry, No. 2.....	13.00 @	13.25
Local Coke Foundry, No. 3.....	12.75 @	13.00
Local Scotch.....	14.00 @	15.00
Ohio Strong Softeners.....	16.00 @	16.50
Southern Silvery, No. 1.....	13.75 @	14.25
Southern Silvery, No. 2.....	13.00 @	13.25
Southern Coke, No. 2.....	12.60 @	12.75
Southern Coke, No. 3.....	12.60 @	12.75
Southern, No. 1, Soft.....	13.00 @	13.25
Southern, No. 2, Soft.....	12.60 @	12.75
Southern Gray Forge.....	12.25 @	12.35
Tennessee Charcoal, No. 1.....	16.50 @	17.50
Alabama Car Wheel.....	14.50 @	15.00
Coke Bessemer.....	16.75 @	17.00
Hocking Valley, No. 1.....	16.75 @	17.00
Jackson County Silvery.....	16.75 @	17.00

**Bars.**—The inquiry for Bar Iron is good and prospects are excellent for considerable business. Contracts placed last week cover a number of orders running from 300 to 1000 tons, the purchasers including implement manufacturers, consumers of hoops, wagon makers and other large manufacturing concerns. Jobbers have also been stocking up to some extent, and the leading mills represented here are again in an independent position. Nevertheless, prices do not strengthen and the situation may be considered weak. Quotations range from 1.50¢ to 1.53¢, Chicago, on base sizes, subject to concessions on good specifications. Soft Steel is in excellent demand and some of the inquiries from consumers are for very large quantities for scattered deliveries. The price on such material ranges from 1.63¢ to 1.70¢, Chicago. Small lots from stock are selling at 1.70¢ @ 1.80¢ for Iron and 1.75¢ @ 1.85¢ for Soft Steel.

**Structural Material.**—Business has been quiet in this line and no large contracts are now in immediate sight. The

opening of the World's Fair and the determination of the city authorities to keep the streets free from obstruction for the summer will have considerable effect on large building operations within the city. But there are outside enterprises from which business is expected at an early day that may make up for at least part of the deficiency in the usual trade here. The new elevated railroad schemes have not progressed far enough to enable any definite statement to be made concerning them. Mill orders, Chicago delivery, are quoted as follows: Beams, 1.90¢ @ 2¢; Angles and Universal Plates, 1.85¢ @ 1.95¢.

**Plates.**—The situation is easily summed up. Very small orders and few of them, with prices weak. Quotations on mill shipment, Chicago delivery, are as follows: Tank Steel, 1.75¢ @ 1.85¢; Shell Steel, 2.10¢ @ 2.15¢; Flange Steel, 2.25¢ @ 2.30¢; Ordinary Fire Box, 3.05¢. Store prices are as follows: Nos. 10 to 14 Iron or Steel Sheets, 2.35¢ @ 2.60¢; Tank Steel, 2.20¢ @ 2.40¢; Shell, 2.35¢ @ 2.50¢; Flange Steel, 2.60¢ @ 2.80¢; Boiler Tubes, 65 % to 67½ % discount, according to size.

**Sheets.**—The Sheet mills appear to be well filled on Black Sheets, but consumers also are well supplied, as new inquiries are rare. The Stove Pipe trade, which has constituted an important outlet for the Common Sheet Iron mills hitherto, has turned this year very largely to Steel Sheets. Some of the leading consumers have purchased nothing but Steel for this purpose. Quotations on small shipments of No. 27 Common Iron range from 2.80¢ to 2.90¢, Chicago, and on Steel Sheets from 10¢ to 15¢ @ 100 advance. Galvanized Iron is in better condition and the weakness which appeared a few days since has gone. Extreme discounts have been withdrawn and the market now appears firm again at 70 and 10 % for Juniata, mill shipment. The local trade in Galvanized Iron is unfavorably affected by the new city building ordinance which prohibits the construction of bay windows and light shafts with combustible lining. The cornice manufacturers are bringing every influence to bear on the members of the Council to have this obnoxious ordinance repealed. Sheet Copper is unchanged at 30 and 5 % for small lots.

**Merchant Steel.**—Season contracts have been placed the past week for considerable quantities of the cheaper grades of Steel, as well as some specials, but the prospects now are that the more important concerns will defer their purchases until next month or even later, in view of the disturbed financial condition, as well as the uncertain crop outlook. Prices on ordinary quantities of Open-Hearth Machinery and Spring Steel are unchanged at 2¢ @ 2.20¢, Chicago, for mill shipments, and Bessemer Tire, 1.70¢ @ 1.75¢, with Bar Iron extras.

**Rails and Track Supplies.**—The situation among the railroads is unchanged and they continue to place orders for small quantities only. Prices are steady at \$30 @ \$32, according to quantity. Iron and Steel Splice Bars are unchanged at 1.60¢ @ 1.70¢; Track Bolts with Hexagon Nuts, 2.60¢ @ 2.65¢; Spikes, 1.95¢ @ 2.05¢.

**Old Rails and Car Wheels.**—Old Iron Rails have not cheapened in price, as was expected, but for some reason have firmed up a little and transactions have occurred in this vicinity at \$18. Dealers, however, are still bidding only \$17 @ \$17.50, and think there must soon be a decline, especially in view of the drop in Scrap. Old Steel Rails are still quoted at \$11.25 @ \$15, according to length. Old Car Wheels are moving in a limited way at \$14.50 @ \$14.75, although small lots are selling at a shade under this for spot cash.

**Scrap.**—Almost the whole list has gone off the past week. Consumers have been favored by accumulations at various points which have caused their offers to be accepted. Never before was Scrap so low in this market. Within the last six years the cheapest grade of Scrap has sold at the price now made on the highest. Forge Scrap is selling to-day at less than half its price in 1887. Selling prices are revised as follows,  $\text{\$}$  net ton: No. 1 Forge,  $\text{\$}14$ ; No. 1 Mill,  $\text{\$}10$ ; Sheet Iron,  $\text{\$}6$ ; Pipes and Flues,  $\text{\$}9.50$ ; Axles,  $\text{\$}21$ ; Horseshoes,  $\text{\$}14$ ; Fish Plates,  $\text{\$}16.25$ ; Spikes and Bolts,  $\text{\$}13.50$ ; Cast Borings,  $\text{\$}5.75$ ; Wrought Turnings,  $\text{\$}7.75$ ; Axle Turnings,  $\text{\$}9.50$ ; Heavy Cast,  $\text{\$}11$ ; Stove Plate,  $\text{\$}8.50$ ; Malleable Cast,  $\text{\$}9$ ; Mixed Steel,  $\text{\$}10 @ \text{\$}10.25$ , gross ton; Leaf Steel,  $\text{\$}17.75$ .

**Metals.**—Navigation from Lake Superior has not opened as early as was expected, and quotations on carload lots of Lake Copper are, therefore, maintained at  $11\frac{1}{2}\%$ . Casting brands are a little weaker and can now be had at  $10\frac{1}{2}\%$ .

## Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., May 2, 1893.

The fifth month of the year has been reached, and still there is no improvement in the Iron or Steel trades. Prices are no worse than they were a month ago, but they are no better, and, for the time being, give but scant promise of being better in the near future.

This may not be due to anything inherently wrong in the trade itself, but more because of the unsatisfactory financial situation, which makes it impossible to embark in extended operations with any degree of confidence. In other respects there is no room for complaint; stocks are light, prices are so low that they cannot be subject to further shrinkage, while the demand is all that ought to be expected under the circumstances. The trade of itself is all right; what is needed is more confidence and easier money. The strongest concerns are unwilling in times like these to tie themselves up to anything involving a large expenditure of money, and that is just what ails the market. How long this state of affairs will continue is a problem hard to solve; but the general impression is that they will be either very much better or very much worse inside of 60 days. The trade cannot stand in its present position very much longer, and while there is a possibility of further unfavorable developments, there are good reasons for taking a more hopeful view of the situation; but as these have already been mentioned, it is not necessary to go over them a second time. Meanwhile it is believed that if the turn should come, it would set things moving at a lively rate. The turn is anxiously awaited.

**Pig Iron**—To use a common expression, "things are down to hard pan in this line." Values may be pounded and hammered in other directions, but it is useless to do it here. Pig Iron has got to a price where there is no room for further concessions. Surplus stocks have been gotten out of the way, and as the current production barely meets the current demand, there is no reason whatever for lowering prices. Some Irons are necessarily harder to sell than others, and some holders are less able to carry stocks than others, but all the same, the general market is in first-class shape to resist pressure, and for similar reasons would probably show considerable buoyancy in case of favorable developments in outside matters. A bad break in Iron is simply impossible, and all that the trade requires is a fair

chance to assert itself. Meanwhile sales are chiefly at figures as quoted herewith for Philadelphia and equivalent deliveries, with  $25\phi @ 50\phi$  less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X.....	$\text{\$}16.00 @ \text{\$}16.50$
American Scotch, No. 2X.....	$15.00 @ 15.50$
Standard Penna. (Lake Ore), No. 1x.....	$14.75 @ 15.25$
Standard Penna. (Lake Ore), No. 2x.....	$14.25 @ 14.50$
Standard Virginia, No. 1x.....	$14.50 @ 14.75$
Standard Virginia, No. 2x.....	$13.75 @ 14.00$
Virginia and Southern, No. 1x, Soft.....	$14.00 @ 14.50$
Virginia and Southern, No. 2x, Soft.....	$13.25 @ 13.50$
Standard Penna. and Virginia Forge.....	$13.00 @ 13.25$
Ordinary Forge.....	$12.50 @ 12.75$

### Freights.

Alabama Furnaces, Rail to Philadelphia.....	$\text{\$}4.31 @ \dots$
Alabama Furnaces, Rail and Water to Philadelphia.....	$4.01 @ \dots$
Alabama Furnaces, Rail to Baltimore and Harrisburg.....	$4.06 @ \dots$
Virginia Furnaces, Rail to Philadelphia.....	$2.25 @ \text{\$}2.75$
Virginia Furnaces, Rail to Harrisburg.....	$1.50 @ 2.00$
Virginia Furnaces, Rail to Baltimore.....	$1.75 @ 2.25$

**Steel Stock.**—The market is inactive, but prices are firm at about the following prices, viz.: Ordinary Bessemer,  $\text{\$}15 @ \text{\$}15.25$ , delivered; standard Bessemer,  $\text{\$}16 @ \text{\$}16.25$ ; Low Phosphorus,  $\text{\$}18 @ \text{\$}18.25$ .

**Steel Billets.**—It is difficult to say what the condition of the market is, there being little or no demand by which to test the matter. Sellers are not inclined to force business, so that it is about an even thing on both sides. Good buyers, however, could place orders for Western Steel at about  $\text{\$}24.25 @ \text{\$}24.50$ , delivered, at points equivalent to Philadelphia, but bids of  $\text{\$}24$  have been declined, so that for the time being prices may be quoted  $\text{\$}24 @ \text{\$}24.50$ , although pressure to either buy or sell would probably easily affect values. At the moment it is a dull, waiting market.

**Steel Rails**—There is quite a good demand for small lots, and mills are running full, and in some cases find it difficult to meet requirements for prompt deliveries. There is also a good demand for Girder Rails, and as the mills are full prices are firmer, and several orders have been turned down. Both the Pennsylvania and the Maryland Steel Companies are fully employed in their various departments, and prospects with them for the summer months appear to be quite encouraging. Quotations are  $\text{\$}29$  for Standard Rails and  $\text{\$}33 @ \text{\$}34$  for Girder Rails.

**Muck Bars.**—There is more business in this line, but prices are irregular. Sales have been made at  $\text{\$}22.50 @ \text{\$}22.75$ , f.o.b. cars at sellers' mills, and there is still a fair inquiry, although some parties claim to be in a position to deliver good Bars at these figures, providing the buyer is gilt-edged and freight not over  $50\phi @ 75\phi$   $\text{\$}$  ton.

**Bars.**—The market is not very satisfactory, and while some of the best makes command a trade at equivalent to  $1.65\phi$ , city delivery, there is plenty of good Iron at less money. At mills in the interior prices are supposed to be about  $1.55\phi$ , f.o.b. cars, but it only needs the right kind of an order to secure a special quotation. Some mills are running nearly full, but the majority have to be constantly on the alert to keep moving at all. Steel Bars range from  $1.55\phi$  to  $1.85\phi$ , according to quality.

**Plates.**—In this department there is a comparatively good demand. Some mills are running from day to day close to the end of their orders, while others with a considerable amount of old work on their books have about all they can do.

Nevertheless the situation is far from satisfactory, as there is little or no margin for profit on the business in hand, and no immediate prospect of things being better. Still, if the present status can be maintained a while longer it is believed that a turn for the better will be ultimately met with. There is business enough on hand and in sight, but it will require a more settled money market to put matters in satisfactory shape. Meanwhile quotations are nominally as follows, but on desirable orders it is not hard to secure special prices:

	Iron.	Steel.
Tank Plates.....	$1.80 @ 1.85\phi$	$1.80 @ 1.85\phi$
Shell.....	$2.10 @ 2.20\phi$	$2.10 @ 2.20\phi$
Flange.....	$2.70 @ 2.90\phi$	$2.25 @ 2.40\phi$
Fire Box.....	$3.00 @ 4.00\phi$	$2.50 @ 2.70\phi$
Special qualities.....	$3.25 @ 3.75\phi$	$3.25 @ 3.75\phi$

**Structural Material.**—Mills are all fairly busy in most of their departments, but there is not much new work coming in at present, so that the feeling is somewhat depressed. Prices are very low, and on recent offerings of business competition has been sharper than ever. Under these circumstances it is difficult to give exact quotations, desirable orders being bid for at specially low figures. General quotations are about as follows: Beams, Channels or Tees,  $2\phi @ 2.20\phi$ , according to size of order; Angles,  $1.80\phi @ 1.85\phi$ ; Universal Plates,  $1.80\phi @ 1.90\phi$ .

**Sheets.**—The demand is very active, and while there is a disposition to insist upon lower prices, manufacturers as a rule have been able to maintain their figures, especially for the best makes. Common qualities are weak, however, and for such extremely low prices have been named. For the best qualities prices are about as follows for small lots:

Best Refined, Nos. 14 to 20.....	$2.75\phi @ 2.85\phi$
Best Refined, Nos. 21 to 24.....	$2.90\phi @ 3.00\phi$
Best Refined, Nos. 25 to 28.....	$3.15\phi @ 3.20\phi$
Best Refined, No. 27.....	$3.30\phi @ 3.40\phi$
Best Refined, No. 28.....	$3.40\phi @ 3.50\phi$
Common, $\frac{1}{4}\phi$ less than the above.	

Quotations given as follows are for the best Open-Hearth Steel, ordinary Bessemer being about  $\frac{1}{4}\phi$  lower than here named:

Best Soft Steel, Nos. 14 to 16.....	$2\frac{1}{2}\phi @ 2\frac{5}{8}\phi$
Best Soft Steel, Nos. 18 to 20.....	$2\frac{3}{4}\phi @ 3\phi$
Best Soft Steel, Nos. 21 to 24.....	$3\phi @ 3\frac{1}{4}\phi$
Best Soft Steel, Nos. 25 to 28.....	$3\frac{1}{2}\phi @ 3\frac{3}{4}\phi$
Best Soft Steel, Nos. 27 to 28.....	$3\frac{3}{4}\phi @ 3\frac{1}{2}\phi$
Best Bloom Sheets, $\frac{1}{4}\phi$ extra over the above prices.	

Best Bloom, Galvanized, discount...  $.70$  and  $5\%$   $@ 70$  and  $10\%$

**Old Material.**—The feeling in this department is very weak, with prices gradually drooping to a lower level. Choice stock when wanted brings fair prices; other descriptions at some concessions from the following, which are the usual asking rates: Old Iron Rails,  $\text{\$}18 @ \text{\$}18.50$ , delivered; Old Street Rails,  $\text{\$}19 @ \text{\$}19.50$ ; Old Steel Rails,  $\text{\$}15 @ \text{\$}15.50$ ; No. 1 Railroad Scrap,  $\text{\$}15 @ \text{\$}16$ , Philadelphia, or for deliveries at mills in the interior,  $\text{\$}15 @ \text{\$}16$ , according to distance and quality;  $\text{\$}8 @ \text{\$}9$  for clean new No. 2 Light Scrap;  $\text{\$}7.50$  for old No. 2 Light Scrap;  $\text{\$}11.50 @ \text{\$}12$  for Machinery Scrap;  $\text{\$}12 @ \text{\$}12.25$  for Wrought Turnings;  $\text{\$}8$  for Cast Borings, and nominally  $\text{\$}22$  for Old Fish Plates, and  $\text{\$}13 @ \text{\$}14$  for Old Car Wheels.

**Wrought-Iron Pipe.**—There is no change to note in this branch of the Iron trade. Prices are extremely low and buyers appear to be unwilling to carry heavy stocks until they see some prospect of the market advancing. Discounts are nominally as follows:

Butt-Welded Black.....	$.60\%$
Butt-Welded Galvanized.....	$.50\%$
Lap-Welded Black.....	$.67\frac{1}{2}\%$
Lap-Welded Galvanized.....	$.57\frac{1}{2}\%$
Boiler Tubes, $2\frac{3}{4}$ inches.....	$.65\%$
Boiler Tubes, 3 inches.....	$.67\frac{1}{2}\%$



## St. Louis.

(By Telegraph.)

Office of The Iron Age,  
Bank of Commerce Building,  
St. Louis, May 3, 1893.

**Pig Iron.**—The market is practically unchanged. The feeling appears to be gaining ground, however, that prices ruling to-day will hardly go any lower, and there seems to be some reason for this belief. The fact that prices have held their own during the past 60 days seems to be good argument why they should remain steady at this period, as the demand continues to show a steady increase, and the greater part of the low-priced iron has been either withdrawn from the market or else furnaces have sold all they desire to. No. 2 Foundry and Gray Forge are quoted, respectively, \$9 and \$8, f.o.b. Birmingham, and at these prices sales are being made to-day. It is true sales have been made at lower figures than those just quoted, but the furnaces accepting them were forced to do so more from the fact that they were in urgent need of money than anything else. Stocks of Iron continue to show a considerable falling off, and furnaces which entered the year with from 40,000 to 50,000 tons on hand now report from 10,000 to 15,000, which indicates that consumption is steady and on the increase. Locally consumers are melting a large amount of Iron, and as nearly all of them have been buying in limited quantities there are no particularly large stocks on hand. During the past week several thousand tons of Iron changed hands, the bulk of which was taken by car manufacturers. We quote as follows for cash, f.o.b. cars St. Louis.

Southern Coke, No. 1 Foundry.....	\$13.50 @ \$14.00
Southern Coke, No. 2 Foundry.....	12.25 @ 12.50
Southern Coke, No. 3 Foundry.....	11.75 @ 12.00
Southern Gray Forge.....	11.25 @ 11.50
Southern Car Wheel.....	18.00 @ 18.75
Lake Superior Car Wheel.....	17.00 @ 17.50
Ohio Softeners.....	16.25 @ 17.00
Missouri Charcoal, No. 1 Foundry.....	13.50 @ 14.00

**Bar Iron.**—The demand for Bar Iron continues to be of good proportions, the car manufacturers being heavy consumers just now. Agricultural implement manufacturers are also in the market, while jobbers report an excellent trade. Prices are not so firm as the demand would seem to warrant. Mills do not seem anxious for orders later than July 1, as there is every indication of labor troubles at that time. Jobbers ask 1.70¢ @ 1.75¢, according to quantity. Mills quote 1.55¢, half extras, f.o.b. cars East St. Louis, which price, however, could be shaded if the specification was a desirable one.

**Barb Wire.**—The month of April has proved a severe trial for this department. There has been nothing but rain during the entire month, which prevented the stringing of many miles of Fence Wire. Prices are not firm, and while \$2.20 for Painted in carload lots to jobbers is the current price, a firm offer of \$2.15 would, no doubt, be accepted. The spring trade will be large, however, and prices may strengthen under its influence. Galvanized is quoted at \$2.60.

**Wire Nails.**—The same conditions affecting Barb Wire has also resulted disastrously to Wire Nails. As a result, prices show a weakening tendency, and \$1.65 f.o.b. cars St. Louis, in carload quantities appears to be the general mill quotation. Jobbers report a fair trade with prospect of improvement as soon as the weather settles.

**Pig Lead.**—The Lead market appears top-heavy, and offerings are free for this month's delivery at 3.80¢. There appears to be no demand whatever, and sellers have a hard time to dispose of their hold-

ings. The statistical position of the market is in good shape, however, and a rally from to-day's prices would not be surprising.

**Spelter.**—This metal is quoted firm at 4.25¢, and sellers are not offering too much of it at this figure. There is still talk of a consolidation of the Spelter interests which tends to lend some additional strength to the market. The coal strike in Kansas which has been used to bull the market failed to materialize on the 1st inst., and consumers who bought thinking a shortage would ensue were bad guessers. Stocks of Spelter are large and do not show any perceptible decrease.

## Boston.

Office of The Iron Age, 146 Franklin St.,  
Boston, May 2, 1893.

The feature in the New England Iron market this week seems to be the better movement in Pig Iron. There is no doubt but what prominent dealers have sold, in the way of orders, lots amounting to 1000 and 2000 tons, generally of Southern Pig Iron. This Iron has gone to the foundry people, who continue very busy. They have a good many orders for building columns, besides being busy upon castings for machinists and manufacturers. It would seem that these foundry people must be making money, since they have about all they can do and the prices of castings do not seem to have declined in proportion to the raw material.

**Pig Iron.**—The market on Southern Pig Iron, while quite active, is yet so thoroughly well supplied that prices favor the buyer. It would almost seem as though it mattered little how much trade there might be there would still be enough Iron at the furnaces. The quotations on Southern Iron are: No. 1, \$15 @ \$15.50; No. 2, \$14.50 @ \$15; No. 3, \$13 @ \$14. These prices are for Iron on dock in Boston. There is a good call for Virginia Iron, with the market at \$15.50 for No. 1, and at \$14.50 @ \$15 for No. 2. Pennsylvania Iron is getting to be a rather small factor in this market. The foundry people are using Southern Iron more and more with Western Irons for mixing. The quotations on Pennsylvania Iron, at shipping port, are at: No. 1, \$14.50 @ \$15; No. 2, \$13.50 @ \$14; Gray Forge, \$13 @ \$13.50. Western Iron is quoted at \$17.50 @ \$18, delivered, in Boston.

**Bar Iron.**—There is a steady demand for Bar Iron, with prices very little changed. New England Old Material Bars are quotable at 1.60¢ @ 1.65¢ from mill; from store, 1.65¢ @ 1.70¢. Best Puddled Iron Bars are quoted at 1.80¢ @ 1.90¢ from mill; from store, 2¢ @ 2½¢. There is a quiet demand for Norway and Swedish Irons, with some new Iron expected soon. But it is explained, however, that the arrival of new Iron has been discounted, so far as values are concerned. The quotation is at \$65 @ \$67 ½ ton for Bars and Shapes.

**Building Iron.**—A quiet trade is mentioned in Building Iron so far as new business is concerned, though there are still some good-sized contracts not yet closed. The market is slightly easier, in the way of prices, but this scarcely seems to start trade. The Boston Bridge Works closed several good contracts the last days of April. The company closed the contract for a fine bridge at Mechanicsville, over the Hudson, for the Fitchburg Railroad; also for several spans for the Concord & Montreal Railroad; one span for the New York & New England Railroad; a bridge at Dover and West Fourth streets, South Boston, for the Old Colony Railroad. In all of these contracts some 1500 tons of Iron will be required. It is also a curious

feature that in nearly every case Iron, and not Soft Steel, is called for. The quotations on Building Iron are revised at: Beams and Channels, 2¢ @ 2.10¢ from mill; from store, 2.40¢ @ 2.65¢; Tees, 2½¢ @ 2.35¢ from mill; from store, 2½¢ @ 2½¢; Angles, 1.95¢ @ 2¢ from mill; from store, 2½¢ @ 2½¢.

**Steel, Steel Plates and Steel Rails.**—The market seems to be rather more certain since the announcement that the Pennsylvania Steel Company are to run right along, though values have not been helped in the least by this feature. The quotations on Manufactured Steel are fairly steady, however: Bessemer Steel, 2.05¢ @ 2.15¢; Machinery, 2¢ @ 2.10¢; Tire and Sleigh Shoe, 2¢ @ 2.10¢; Sheet, 2½¢ @ 2½¢; American Cast, 7¢ @ 7½¢; English Cast, 14½¢ @ 15¢. There is some movement mentioned in Steel Rails, with the market at \$29 at mill. The New York, New Haven & Hartford Railroad is reported to have placed a very large order for 100 lb. Rails. Steel Plates are in some request, with the market easy in the way of values. Quotations are mentioned at: Tank, 1.90¢ @ 1.95¢; Shell, 2¢ @ 2.05¢; Refired, 2.10¢ @ 2½¢; Flange, 2½¢ @ 2.30¢; Fire Box, 2.60¢ @ 3¢.

**Nails.**—The movement in Nails is fair, since prices are slightly easier. Cut Nails, both Iron and Steel, are quotable at \$1.50 @ \$1.60 for small lots, and \$1.45 @ \$1.50 ½ keg for large lots. It seems that the Steel Wire Nail people did not raise the prices of Wire Nails at their last meeting after all, so far as this market is concerned. The quotation is at \$1.75 @ \$1.80, according to the size of the lot in question.

**Pipe and Tubes.**—There is a better trade in Pipe. The dealers mention some good orders for water works. These orders would have been placed earlier but for the fact that there is still a deal of snow and frost in the ground in Northern New England. The quotations on Pipe are steady. Boiler Tubes have been in better demand since the adjustment of the boiler-makers' difficulties, and the market is firm at 60 @ 65 % off from list, according to the size of the order.

**Scrap Iron.**—Old Iron is not in satisfactory demand, though values are steady. No. 1 Wrought is quotable at 55¢ @ 60¢, with choice selections, including Old Horseshoes, at 60¢ @ 70¢. Light Scrap is very quiet at 30¢ @ 45¢, with Machine Shop Scrap at 25¢ @ 30¢ for Cast, and at 30¢ @ 35¢ for Wrought.

## Cleveland.

CLEVELAND, OHIO, May 1, 1893.

Instead of an output of Iron Ore for 1893 aggregating 9,500,000 or 10,000,000 tons, mine owners are now making estimates of 6,000,000 and 7,000,000 tons as the maximum figures. The Pig-Iron market gives little encouragement to the hope that, after all, the demand must come sooner or later. The Ore market is quite as devoid of life just at present as a mummy in the Egyptian catacombs. Once in a while a display head appears in a local paper over a sale of a few thousand tons of Ore; few, however, are deceived thereby. The Ore market is very lifeless. The heavy buyers have done almost nothing and are making the claim to-day that 5,500,000 or 6,000,000 tons will represent the output for 1893. The fact remains, however, that the transportation rates from Lake Superior ports are dropping with commendable alacrity. No one any longer talks of 85¢ or 90¢ for Escanaba. Instead charters are being made, and plenty of them too, at 65¢ ½ ton from that port, with an excellent prospect of the rate going as low as 60¢ ½ ton later on. There were bold claims a few weeks

ago that no charters could be made from Ashland to Ohio ports at a rate below \$1.25 per ton, but it is generally admitted that \$1.10, and, indeed, perhaps \$1.05 would be accepted if ordered to-day. The buyers have really very much the best of the situation. They must pay a slightly higher price for carrying Ore from Ohio ports to furnaces, but in every other respect they are in a position to dictate terms. They are, of course, a few days nearer the time when purchases must be made, but otherwise the situation has not changed.

With only two or three exceptions mining operations are expected to be suspended to-night in nearly all the mines in the Gogebic Range. So much Ore has already been mined that the operators do not feel like going ahead with production until sales of some importance have been made. The Ore will remain in the mines until something occurs that will justify a renewal of operations. The outlook just now is that it will be several weeks before the Ore market for 1893 really opens.

**Iron Ore.**—Every possible effort is being made to rush the Ore now on the docks forward to the furnaces. Last week 44,000 tons were forwarded from Cleveland, an increase of 14,000 tons over the corresponding season of 1892. The shipments from Fairport, Ashtabula and other Lake Erie harbors were also large. Sales were confined to small quantities, principally special lots desired for particular grades of Iron and Steel. Vessel rates are as much of an enigma as ever. The talk to day is of rates as low as 55¢ @ 60¢ from Escanaba. If this should be brought about the talk among the buyers of picking up good Bessemer Ore at \$3.50 @ \$3.60 per ton might not be so far off of the way.

**Pig Iron.**—The market shows few signs of life. The tendency is toward lower prices and the market is decidedly duller than last week's report indicated. Buyers ask after Bessemer Irons eagerly enough, but want them at suicidal figures. Sales of Bessemer at \$13.50 are reported, but the amounts involved were generally small.

**Nails.**—Dealers quote Wire Nails at \$1.65, in stock, or at \$1.55 in carload lots, Cleveland or Pittsburgh. Some improvement, too, is noted in the demand for Cut Nails.

**Muck Bar.**—The market is still very weak, and there seems little prospect of an immediate improvement. Local quotations to-day are \$24 per ton, with few deals recorded.

**Bar Iron.**—The demand is fair at \$1.65 for Common Bar, with several fairly good sales reported.

**Scrap.**—The market continues dull. Dealers ask: \$15 for No. 1 Railroad Wrought; \$11 per ton for Cast Scrap; \$10 per ton for Wrought Turnings, and \$7 per ton for Cast Borings.

**Old Rails.**—The demand for Old Americans is not very strong. A sale or two at \$19 @ \$19.25 is reported.

**Old Wheels.**—We hear of a sale at \$14 per ton. Sales are confined to small amounts.

## Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts.,  
CINCINNATI, May 3, 1893.

There is no increase in the volume of business in Pig Iron, and the transactions are mainly in small lots. A few sales have been made of 1000 tons in each instance, but many are from one to ten carloads, and yet in the aggregate they foot up quite a good amount. Some factories say that the volume of business in April was larger than any previous like period. The sales have been chiefly for four and five months

ahead, and yet it is only because buyers prefer this delivery, for they could as well obtain Iron for six months or any time during this year for the prices current. Prices remain steady at \$9.00 for No. 2 Foundry, f.o.b. Birmingham, and although there have doubtless been sales for less it was exceptional, and at points where the difference in freight made up for the concession in price. On the other hand, it has been difficult to obtain this Iron for prompt immediate shipment. There have been no large sales of Charcoal Iron, but a fair volume of business is claimed in small lots. Quotations are as follows:

### Foundry.

Southern Coke, No. 1	.....	\$13.25 @	\$13.50
Southern Coke, No. 2	.....	11.75 @	12.00
Southern Coke, No. 3	.....	11.00 @	11.25
Ohio Soft Stone Coal, No. 1	.....	16.00 @	16.25
Ohio Soft Stone Coal, No. 2	.....	15.00 @	15.25
Mahoning and Shenango Valley	.....	14.75 @	15.00
Hanging Rock Charcoal, No. 1	.....	19.00 @	19.25
Hanging Rock Charcoal, No. 2	.....	18.00 @	18.50
Tennessee and Alabama Charcoal	.....		
No. 1	.....	15.50 @	15.75
Tennessee and Alabama Charcoal,	.....		
No. 2	.....	14.50 @	14.75

### Forge.

Gray Forge	.....	10.75 @	11.00
Mottled Neutral Coke	.....	10.85 @	10.90

### Car Wheel and Malleable Irons.

Standard Southern Car Wheel	.....	18.00 @	19.00
Lake Superior Car Wheel and Malleable	.....	17.75 @	18.00

## Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building,  
PITTSBURGH, May 2, 1893.

**Structural Material.**—There is nothing special to report this week. A moderate tonnage is being called for and with favorable building weather for the next few months, it is expected that a heavy tonnage will develop. According to an official of the Carnegie interests, that concern is now selling 75 % of the entire consumption of Beams and Channels in this country, and with the recent improvements at the Homestead Steel Works it is believed that sufficient tonnage could be turned out to meet the entire demand. From this it will be seen that Pittsburgh largely controls the situation, and the smaller concerns are at considerable disadvantage. Prices do not show any tendency whatever to improvement, and with the large capacity for production it is the impression that present low prices will continue to prevail for some time. We quote as follows: Beams and Channels in ordinary lots, 1.65¢ @ 1.70¢; Angles, 1.60¢ @ 1.70¢; Z-Bars, 1.80¢ @ 1.90¢, and Tees, 1.85¢ @ 1.90¢. A slight labor trouble cropped out this week in the 38-inch department of the Homestead Steel Works over a revision of the wage scale, but it is expected that it will be adjusted before the week is up.

**Plates.**—Inquiries have been slightly better during the past week and some large shipyard contracts are expected to be let during this month, of which Pittsburgh makers expect to secure a part. Prices continue to rule very low and on some kinds of Plates it is evident that selling prices are hugging cost mark, especially mills whose equipment is not as modern as that possessed by some of their competitors. We repeat quotations of last week, as follows: Ordinary Five Box at 2.25¢ @ 2.50¢; best Quality, 3¢ @ 3.25¢; Flange, 1.90¢ @ 2¢; Tank, 1.60¢ @ 1.65¢; Shell, 1.75¢ @ 1.80¢; Universal Plates, 1.65¢ @ 1.75¢.

**Ferromanganese.**—A fair demand is going for small lots and prices continue to rule at \$58.50 @ \$59, f.o.b. cars Pittsburgh.

**Steel Rails.**—The situation is unchanged from that of last week. A fair volume of business is going, confined principally to

small lots, which makers say is sufficient to sum up a fairly large aggregate. Pittsburgh has captured an order for about 8000 tons for delivery to the Toledo & Ann Arbor Railroad. We continue the quotation of \$29 at mill for standard sections.

**Old Rails.**—As in the case with Scrap material, there is little or no demand for Rails, many concerns using Old Rails having again taken up the use of Pig Iron in their stead. We quote short Steel Rails at \$15; Mixed Lengths, \$14, and Long Lengths, \$15.50. Old Iron Rails may be quoted at \$20, although we have not been advised of a sale for some time.

**Muck Bars.**—Demand is exceedingly dull and prices continue to rule at \$24 @ \$24.15, f.o.b. cars Pittsburgh.

**Wire and Cut Nails.**—Well-defined reports have been received here to the effect that Wire Nails are offered in Chicago at \$1.55 in carload lots, which is equivalent to \$1.40, Pittsburgh. This will probably have a disquieting effect on prices here, and already it is intimated that some mills have been asked to cancel contracts closed some time ago at the advanced prices. For some time past the demand for Wire Nails has been light, buyers holding off placing orders in the belief that prices would not be sustained. It is altogether probable that the decline in prices of Soft Steel is largely responsible for the present weakness in prices of Wire Nails. In Cut Nails the situation is fairly satisfactory. Mills in the Wheeling district are reported as having considerable business, large shipments being made regularly to Southern points on the Ohio River. The market is fairly represented by the quotation of \$1.15 base, in carload lots at mill.

**Pipes and Tubes.**—During the past week the Indianapolis Natural Gas Company of Indianapolis, Ind., placed an order for about 16 miles of 10-inch Wrought Iron Line Pipe, the contract going to an Eastern mill. Another large contract for Line Pipe is in the market and will probably be closed during this week. Makers advise us that the demand for nearly all sizes of Pipes and Tubes is better at this time than for some months past, and the outlook for the future is very encouraging. Discounts as recently adopted are reported as being fairly maintained and are as follows: Butt-Weld Black Pipe, 60 % discount from manufacturers' list; Butt-Weld Galvanized, 50 %; Lap-Weld Black, 67½ %; Lap-Weld Galvanized, 57½ %. On Boiler Tubes discounts are as follows: 2½-inch and smaller, 65 %; 3-inch and larger, 67½ %.

**Wire.**—It is safe to assert that makers of Wire have no reason to complain of trade this year as far as volume of business is concerned, and prices have been satisfactory in the main. The consumption of both Plain and Barb Wire has been extremely heavy and bids fair to continue so until the end of the season. A number of mills are considerably behind in shipments, some of them having booked more largely than their capacity for production would warrant. Prices on Barb Wire continue to rule at 2.15¢ for Painted and 2.55¢ for Galvanized, in carload lots, with a slight concession on these prices for buyers of round lots. The demand for Plain Wire also continues heavy and prices are being fairly maintained on the following basis: Nos. 6 to 9, 1.70¢; Nos. 10 and 11, 1.80¢ @ 2¢; No. 12, 1.90¢; No. 13, 2¢, and No. 14, 2.15¢.

**Bars.**—Favorable reports are received as to the condition of the Bar Iron trade in the Mahoning Valley, mills generally being fairly well employed and inquiries reported as more numerous than for some time past. Prices are ruling at about 1.45¢, half extras, at mill, with slight concessions on desirable business. In the



Pittsburgh district the situation as noted for several weeks past is without material change. Some mills have considerable work and are fully employed, while others find it difficult to secure enough business to keep running, and are frequently compelled to make concessions in the way of prices in order to capture trade that would otherwise go to competitors. Implement makers are in the market for season contracts, and considerable tonnage in Steel Bars will doubtless be placed during this and next month. We continue to quote Soft Steel Bars at 1.50¢ @ 1.55¢, half extras, at mill. Some concerns report that they have not accepted business at less than the last named price for some time.

**Wire Rods.**—A material decline in prices of Soft Steel Billets has affected Wire Rods to some extent and with a slight inquiry prices have declined slightly and we now quote at \$30.50, f.o.b. cars Pittsburgh. Some buyers intimate that a desirable order placed at this time would be accepted at a slight concession from the above.

**Sheets.**—The favorable condition of this trade noted for several weeks past continues, and the volume of business offered is sufficient to keep mills well employed. The demand at this time seems particularly heavy for delivery before July 1, in the anticipation of possible labor complications. Prices are firm and we continue to quote No. 24, at 2.50¢; No. 26, at 2.60¢, and No. 27, at 2.70¢, in carload lots.

**Scrap Iron and Steel.**—Scrap material of all kinds continues exceedingly dull, and as a consequence prices are very low and altogether in favor of buyers. The market at this time is in that position where it is not so much of a question as to what the buyer will have to pay for Scrap material as what he will condescend to offer. In the face of these conditions nothing more than nominal quotations can be given, and we quote as follows: No. 1 Railroad Wrought Scrap, \$15 @ net ton; Leaf Springs, \$21, and Coil Springs, \$17.50. Little or nothing is being done in the other kinds of Scrap material and we omit quotations.

(By Telegraph, May 3, 12.30 p.m.)

**Pig Iron.**—During the week under review the pressure to sell Bessemer Pig Iron was more marked, and as a result prices have again declined slightly. When Bessemer Pig touched \$13.50, Pittsburgh, it was largely the impression of buyers and sellers that the price could probably be maintained at that figure, but this has not proved to be the case. This last decline is undoubtedly principally due to two causes, first of which is the extraordinary production of Pig Iron in Allegheny County for March and April, and the second is the taking off of a large Steel mill, which has thrown more Iron into the market. The largest maker of Pig Iron in this district is reported as having entered the market recently as a seller in order to dispose of surplus product. Notwithstanding the fact that the outlook for the Pig Iron trade at this time is not favorable by any means, it is generally the impression that just as soon as some business is done between Ore men and furnace operators the market will take on a steadier aspect. Until this occurs, however, any recovery in prices is thought to be out of the question, and if the present rate of production is maintained it may result in prices being forced still lower. As was

the case in March, every stack in Allegheny County was in operation during April, with the single exception of Soho, the product being very close to 165,000 tons. We quote as follows:

Neutral Gray Forge.....	\$12.25 @	cash.
Ad-Ore Mill.....	12.50 @	"
No. 1 Foundry.....	13.75 @	\$14.00. "
No. 2 Foundry.....	12.75 @	13.00. "
Charcoal Foundry No. 1.....	17.00 @	18.00. "
Charcoal Foundry No. 2.....	16.50 @	17.00. "
Bessemer Pig.....	13.40 @	13.50. "

A transaction is reported as closed during the week involving 12,000 tons of Bessemer for extended delivery at a price equal to \$13.40, Pittsburgh.

**Billets.**—As in the case of Bessemer Pig, there was more pressure to sell during the week, and some sales of Billets are reported as having been made for May and June delivery on a basis of \$21.75, Pittsburgh. This pressure to sell comes largely from brokers who bought heavily during the advance, and are now anxious to dispose of their holdings. As far as known, the mills here and in Wheeling are pretty comfortably fixed for May and June, and while they could doubtless spare some Steel during this and next month, they have not been pressing the market hard enough to bring about the recent heavy declines in price. Steel for May and June may be quoted at \$21.75 at maker's mill, while for extended delivery \$21.50 at maker's mill has been done. Duquesne is still off, but will probably start up before this month is out. The improvement now being made will very largely increase the capacity of the plant.

## New York.

Office of *The Iron Age*, 96-102 Reade street, 1  
New York, May 3, 1893.

**Pig Iron.**—The market is dull, and sellers do not regard the future hopefully. The general feeling is that the condition of financial affairs will tend to make buyers even more conservative in closing contracts, and may force some furnaces to market occasional blocks at a sacrifice, in order to secure ready money. Southern No. 2 Soft has sold as low as \$8.50, Birmingham. We quote Northern brands at \$14.50 @ \$15.25 for No. 1; \$13.75 @ \$14.50 for No. 2; \$12.50 @ \$13 for Gray Forge, tidewater. Southern Iron, same delivery, \$14.25 @ \$14.50 for No. 1; \$13 @ \$13.50 for No. 2 and \$13.25 @ \$14 for No. 1 Soft; \$12 @ \$12.50 for Gray Forge.

**Steel Rails.**—The Eastern market is exceedingly dull, the mills not having sold any lots of consequence. Among the Eastern mills the Lackawanna is in by far the best position, so far as orders are concerned, followed next in order by the Maryland, with about 90,000 tons booked for 1893 delivery, a part of which has, of course, been delivered. Standard Rails continue \$29 at mill or tidewater, and Girder Rails, \$31 @ \$33.

**Track Material.**—Spikes are quoted at 1.85¢ @ 1.95¢; Fish Plates at 1.50¢ @ 1.60¢; Track Bolts, square nuts, at 2.4¢ @ 2.50¢, and hexagon nuts at 2.5¢ @ 2.60¢, delivered.

**Manufactured Iron and Steel.**—Every one is on the tip-toe of expectation concerning the large New York Central order to be closed this week. It will call for about 3800 tons of Sheared Plates, 9200 tons of Universal Plates, 700 tons of Bars, and for other material, the total aggregating close to 17,000 tons. A few moderate sized architectural jobs have been closed, among them a building at

Fourth and Broadway and one at Lafayette place. Thus far this year only one really large building, the Manhattan Life, has been placed, but, on the other hand, the number of small structures has been unusually large, thus helping the tonnage quite well. Prices in all lines of Manufactured Iron and Steel are wretchedly low. We quote: Beams up to 15-inch, 1.80¢ @ 2.10¢; 20-inch, 2.10¢ @ 2.25¢; for round lots; Angles, 1.75¢ @ 1.90¢; Universal Mill Plates, 1.80¢ @ 1.90¢; Tees, 1.85¢ @ 2¢; Channels, 1.85¢ @ 2¢, on dock. Steel Plates are 1.80¢ @ 2¢ for Tank; 2.10¢ @ 2.25¢ for Shell; 2.25¢ @ 2.50¢ for Flange, and 2.50¢ @ 2.80¢ for Fire Box, on dock. Refined Bars are 1.65¢ @ 1.9¢, on dock, and Common 1.55¢ @ 1.60¢. Scrap Axles are quotable at 1.90¢ @ 2.10¢, delivered. Steel Axles, 1.85¢ @ 2¢, and Links and Pins, 1.85¢ @ 2.10¢; Steel Hoops, 1.80¢ @ 1.90¢, delivered; Cotton Ties, 80¢ @ bundle, at mill.

**Merchant Steel.**—We quote: Machinery at 1.75¢ @ 2¢; Toe Calk, 2¢ @ 2.25¢; and Sleigh Shoe, 1.75¢ @ 1.90¢.

**Old Material.**—We quote: Old Iron Rails, \$16.25 @ \$16.50, on cars Jersey City, and Old Steel, \$12.75 @ \$13.

**Spiegeleisen and Ferromanganese.**—Quotations remain nominally as follows: \$22 @ \$22.50 for 10 % and \$25 @ \$25.50 for 20 % Spiegeleisen, and \$57 @ \$57.50 for foreign 80 % Ferromanganese.

**Billets and Rods.**—The market is dull and easier for domestic material. We quote, nominally, domestic Billets, tidewater, \$24.50 @ \$25; foreign, nominally, \$29 @ \$29.25; domestic Wire Rods, \$33 @ \$34; foreign Wire Rods, \$40 @ \$40.50, and Swedish Rods, \$52 @ \$53.

Rogers, Brown & Warner, Pig Iron merchants, have removed to the Vanderbilt Building, Beekman and Nassau streets.

Warren, Wood & Co., Pig Iron merchants, have removed from the Columbia Building to the Boreel Building, Broadway.

William R. Thomas, sales agent for the Thomas Iron Company of Hokendauqua and of the Pioneer Mining & Mfg. Company of Birmingham, Ala., has removed his office to 50 Wall street.

## Metal Market.

**Copper.**—The rumor referred to in last week's report to the effect that a large quantity of Lake Superior Ingot was sold to American consumers at 11¢ @ lb has been confirmed. Particulars as to quantity of Copper involved and the prices paid were not divulged, but there is quite good evidence that the contracts represented at least 15,000,000 lb, and that the deliveries run three to six months ahead from May 1. More recently quite 1,000,000 lb have been sold at the same price by other Lake Superior producers. Common Casting Copper is somewhat lower in sympathy, with 10½¢ now fairly reflecting market values. Operations in this class of material have been on a somewhat larger scale, but not extensive enough to indicate that consumers of the lower-grade article are as well satisfied with the price for the same as are consumers of Lake Copper. There was a firmer feeling at the close, with bids of 11¢ for Lake Ingot turned down by some producers.

**Pig Tin.**—Arrivals from London continue heavy and have added still further to the stock in first hands here, without preventing accumulation at that point. According to the data given below there was an increase last month of 1213 tons in New York and 156 tons in New York

stocks, which, despite a reported decrease of 730 tons in Holland, leaves an unprecedented stock. The quantity afloat was 1408 tons less on May 1 than on April 1, however, owing to much lighter shipments from the Straits, and some authorities express the opinion that the quantity of Tin to arrive here before July 1, when the duty of 4¢ per pound is supposed to go into effect, is a known quantity and that the greater portion of the supply is in strong hands. This idea is supported in some measure by the fact that prices are moved up a little as soon as there are signs of "short" interest in the market and not permitted to react below a certain point. Thus July delivery was raised to 21¢ on Saturday, but not permitted to drop below 20.80¢ afterwards, cash stock, in the meantime, being held steadily at 20.60¢ @ 20.65¢. Fair average consumption assists in sustaining the market, but careful manipulation is evidently the greater force in preventing prices from weakening under the weight of present heavy stocks. At the close, Wednesday, the market looked rather soft, with sales recorded on the Metal Exchange of 50 tons, May arrival, at 20½¢, cash, against documents, and 25 tons, June delivery, at 20.65¢, regular, and 25 tons, May delivery, at 20½¢, sellers' right to double.

Below we give the statistics for Europe and the United States, as compiled by the New York Metal Exchange, showing total visible supply May 1, 1893, of 17,171 tons against 17,855 tons April 1, 1893, and 11,967 tons May 1, 1892, with details of movement as follows:

Shipments.			
Straits:			
To Great Britain.....	1,400	3,750	1,450
To Continent Europe.....	325	350	325
To United States.....	580	1,080	880
Total from Straits....	2,305	5,180	2,655
Australia:			
To Great Britain.....	350	250	230
To United States.....	.....	50	50
Total from Australia....	350	300	280
London to United States....	1,770	2,050	600
Holland to United States....	160	40	140
Total from Europe....	1,930	2,090	740
Consumption:			
London deliveries.....	1,330	1,500	1,380
Holland deliveries.....	820	710	700
U. S. excl. Pacific Ports....	1,600	1,800	1,600
Total.....	3,750	4,060	3,680
Stock.			
London.....	3,714	3,553	4,350
Holland.....	990	1,720	1,220
U. S. excl. Pacific Ports....	4,905	3,692	2,864
Total stock at close of month	9,609	8,970	8,434
Afloat:			
London.....	3,552	5,000	3,685
Holland.....	960	600	1,020
U. S. excl. Pacific Ports....	3,050	3,285	2,820
Total afloat at close of month.....	7,562	8,970	7,525
Total visible supply. .	17,171	17,855	15,959

**Pig Lead.**—The market has remained in a dull and somewhat feverish condition, with underlying symptoms of weakness. During the period under review some sales were made at as low as 4¢ regular, while official bullion price dropped to 3.95¢. Subsequently single carloads were sold at 4.05¢ @ 4.07½¢, but later on there were free sellers at 4.05¢ and no buyers of round lots at above 4¢. The weakness of the market is due chiefly to narrow outlet for the metal latterly and some pressure to sell, superinduced by stringency in the money market.

**Spelter.**—Western brands delivered here and at common point are now quoted at 4.50¢ @ 4.60¢, with comparatively light offering for either prompt or future shipment. Demand in this quarter has continued light and is so at this writing. The strength of the market seems to be due in part to recent extensive purchases by Western galvanizers, but chiefly to anticipated labor troubles in the Western coal regions.

**Antimony.**—No change reported. Business moderate and chiefly at former prices, say 10¢ @ 10½¢ for Hallett's, 10½¢ @ 10½¢ for L.X., and 10½¢ @ 10½¢ for Cookscn's.

**Tin Plate.**—No improvement reported in the demand for spot stock or future shipments. Supplies here are liberal, with quite good assortment. Prices seem to be a little soft, but show no radical change. Spot quotations are as follows: Coke Tins—Penlan grade, IC, 14 x 20, scarce; J. B. grade, do., scarce; Bessemer full weight, \$5.50; light weights, \$5.10 @ \$5.12½ for 100 lb, \$5 for 95 lb, \$4.90, nominal, for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.60 @ \$5.65; Siemens Steel, IC basis, \$5.75; IX basis, \$6.85. Charcoals—Melyn grade, IC, \$6.50; Crosses, \$8; Allaway grade, IC, \$5.70; Crosses, \$6.90; Grange grade, IC, \$5.80; Crosses, \$7. Charcoal Terns—Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11.85; M. F., 14 x 20, \$7.25; do., 20 x 28, \$14.50; Dean grade, 14 x 20, \$5.30 @ \$5.37½; do., 20 x 28, \$10.50 @ \$10.70; D. R. D. grade, 14 x 20, \$5.20; do., 20 x 28, \$10.30; Wasters—S. T. P. grade, 14 x 20, \$5; do., 20 x 28 \$9.70; Abercarne grade, 14 x 20, \$4.95; do., 20 x 28, \$9.50. Black Plates for tinning, to arrive, are quoted at \$3.65 @ \$3.70 for IX, and \$3.70 @ \$3.75 for IC, to arrive.

## Coal Market.

The Coal market is dull in both departments—Anthracite and Bituminous, and no change has taken place within the week. The Anthracite market is construed as being in a waiting condition, pending the Reading reorganization and the part to be acted by Mr. Harris, McLeod's successor. The scarcity of the small steam sizes is almost a famine, caused by restrictions and active consumption, Pea selling at \$3 alongside in New York and Buckwheat \$2.35, alongside. The trade newspapers last week were widely at fault in stating that the sales agents had made another reduction of 5¢ per ton. What they really did at their last meeting was to make prices at various points West conform to the reductions made in Eastern prices last March. Though varying with the locality the reductions average about 50¢. The Reading issued orders to close 12 to 15 collieries, leaving 35 in operation.

Bituminous Coal is quoted \$3.10 alongside in New York for Clearfield and \$3.35 for St. George's Creek Cumberland. The advance in railroad tolls in April makes the rate \$2 to New York tidewater and \$1.40 to tidewater in Philadelphia and Baltimore. At the latter point shipping expenses of 8¢ @ 10¢ per ton are added, according to the quantity of Coal.

Increase of Anthracite output this year 1,129,695 tons over same date last year. Output this year, 12,377,912 tons. Pennsylvania Railroad Coal tonnage, 310,577; Coke, 102,437. Reading tonnage, 420,000. Rates to Boston, \$1.05 @ 1.15 from Philadelphia.

The Reading rehabilitation plan embraces a scheme for the organization of a new Coal company with a capital of \$10,000,000, formed for the sole purpose of handling the Coal business of the Reading Company. It is said the name to be given to it will be the National Coal Company.

Edward B. Leisenring succeeds Mr. Harris as president of the Lehigh Coal & Navigation Company.

A convention representing the railroad coal miners in Western Pennsylvania met in Pittsburgh and decided not to ask for any advance in wages.

All of the Coal and Coke companies in West Virginia in which ex-Secretary of War S. B. Elkins is interested, except the Junior Coal Company, have been consol-

idated under the name of the Davis Coal and Coke Company, with Mr. Elkins as president. The capital stock of the consolidated company is \$3,000,000, and the company control 49,000 acres of Coal and mineral lands in the State.

## Financial.

Although Wall street is temporarily disturbed by the calling in of loans and unfavorable news from various quarters, a much more confident feeling prevails since the recent conferences between Secretary Carlisle and the bank presidents, one of whom authorized the statement that "it was formally agreed that the banks represented by the committee shall whenever necessary furnish the Government with all the gold it may require. The details of the agreement are now being perfected, and as soon as the full plan is completed it will be given to the public. This agreement was intended simply for any possible emergency, as the conference was a unit in the opinion that at present there is no need for assistance, the gold held by the Government now being amply sufficient for all requirements. No issue of bonds will be made and no radical measures will be taken as long as matters are in their present shape." The main point gained thus far is the emphatic assurance that the Government credit will be used to maintain the parity of gold, silver and issues of paper. With this understanding offers of gold will be made freely from different parts of the country, in the expectation that an issue of bonds may be avoided until Congress shall provide adequate relief. The chief objection on the part of the Secretary to a bond issue is that it would impede the repeal of the Sherman law. The administration, it is assumed, is willing that the full effects of the Sherman act shall be felt, in order that the whole country may unite in a movement for its repeal. One consequence the mercantile classes may experience under this policy is a contraction of credits hazardous to those whose business is unduly extended. Already a number of heavy failures, particularly in the West, are ascribed to this cause. Trouble at West Superior is a case in point. Among the better signs is the partial cessation of imports and the promise of augmented exports, to follow the opening of navigation. Delay in opening the Erie Canal until the 8th or 10th excites much impatience. The total imports at New York for the week are \$4,000,000 below those for the previous week.

The stock markets were disturbed by unfavorable news and dear money, caused by the calling in of loans, resulting in sharp declines. On Saturday there was a break in Toledo, Ann Arbor & North Michigan, on news of the appointment of a receiver, a further fall in Reading and in Whisky, and bearish demonstrations upon other active stocks. On Saturday the market was broken down at the opening by a vigorous raid based upon the news of the failure of the National Bank of Australasia, which, it was expected, would cause a further movement of gold from London to Australia and an advance in the Bank of England minimum rate of discount. Cordage was influenced by the report of an intended issue of new stock. There was an advance in Toledo, Ann Arbor & North Michigan on a report subsequently denied that the Lackawanna would obtain control, and Reading was well supported in consequence of the publication of further details of the reorganization plan. The one item of news which was satisfactory to investors was the action of the Pennsylvania Company in declaring a dividend of 2½% in cash, and 2% stock in certificates convertible into

stock. News of the intended shipment of \$500,000 added to the uneasy feeling.

United States bonds were quoted as follows:

U. S. 4½s, 1891, extended.....	99
U. S. 4s, 1907, registered.....	112½
U. S. 4s, 1907, coupon.....	112½
U. S. currency 6s. ....	106

The week ended with higher rates for money, call loans touching 12 %. Time loans were in good demand, but it was not easy to make them. The gold note is almost universally demanded. The only rate named is 6 % for all dates. Commercial paper is dull. The banks provide only for the wants of their regular customers. Quotations are 6 @ 10 %. The interior banks are timid in consequence of failures in various parts of the country. The bank returns show a loss of \$4,769,500 in cash, and \$2,627,050 in surplus reserve, which now stands at \$12,156,150. Exchange was easier early in the week, indicating a more confident feeling on the part of the foreign bankers in the currency situation, but was firmer at the close and near to the gold-shipping point. The May disbursements for interest and dividends are about \$1,000,000 larger than for May, 1892. A Vienna letter of April 18, speaking of currency reform, says that Hungary has already obtained all the gold necessary for the purpose, except the small sum of 15,000,000 florins, and Austria has been equally successful.

General business has been checked by bad weather and the Columbian festivities, and, as a whole, trade is backward. Prices of wheat fluctuate within narrow limits, and the export trade is moderate. Winter wheat prospects do not encourage the expectation of a large yield. Storms in Kansas and neighboring States have done much injury and seeding elsewhere has been arrested. The abundance of old wheat operates to prevent enhanced values. Provisions were firmer, pork in Chicago touching \$20.10 per barrel, the highest price of the year, based on small supplies. Cotton dull and a shade lower. Rubber firm but quiet.

Freight rates by the canal are 5¢ @ 5½¢ for wheat for vessels now in Buffalo. Most of the boats, however, have been chartered on the basis of 4¢ for wheat and 3½¢ for corn. Railroad rates, as a rule, are about 1¢ higher than the canal rates.

The German Iron Trade.

(One mark per metric ton is equivalent to 24.8 cents per gross ton.)

DUSSELDORF, April 15, 1898.

The Prussian State Government is about to vote \$8,000,000 for the completion of the railways of the country, \$5,000,000 thereof being required for rolling stock. This prospective business is supposed to be of special interest to the German Iron trade, in view of recent developments in closing contracts at Cologne. It was shown then that the present Minister, Thiele, is not willing to give foreign producers preference merely on the ground of lower offers. In the case at Cologne Belgian car makers bid \$25 per car less in some cases than the German manufacturers, and yet the latter secured the business at the prices at which they bid.

The general improvement in the market has not progressed further, but it is stated that a good many orders have been booked during the week for Finished Iron, particularly Beams, Bars and Plates. In general prices show no change, although the manufacturers of architectural castings have advanced their prices \$2.48 per ton. The makers of stamped hollow ware have also decided to increase their rates by 10 %.

The Ilse works near Hanover, which are famous as the cheapest producers of basic pig on the Continent, have declared a dividend of 18 % for 1892. The

blast furnaces produced 131,149 tons of Pig Iron, while the Steel works and rolling mills made 107,613 tons. It is remarkable that the coke consumption per 1000 lb of Pig Iron was not more than 894 lb, as compared with 940 lb in 1891, and that the cost declined from \$7.95 in 1891 to \$7.37 in 1892.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, May 3, 1893.

There is no increase in Iron to warrant speculation, and prices remain almost stationary. Latest dealings were at 40/8 @ 40/9 for Scotch, 33/10½ @ 34/ for Cleveland, and 45/5 for Cleveland. Stocks in public stores have undergone hardly any change. Shipments of Cleveland Iron by makers have, however, been quite heavy.

Pig Tin for prompt and early delivery advanced somewhat early in the week, but subsequently reacted. Futures have also ruled irregular within narrow limits. Business has been moderate in absence of outside speculative interest and want of American support. At the close prices weakened decidedly on spot under realizations. Shipments from the Straits last month were 2290 tons.

Copper has been inactive and price for Merchant Bar prompts has remained at about £44. 7/6. Speculative operations are deterred by weak reports from American market and continued delay in signing agreement extending the period of limitation of output. Demand from consumers is also quiet. Sales of furnace material recently include 260 tons ordinary Montana Matte at 9/1½ and 1200 tons Argentiferous on private terms. Stocks are now light and 9/7½ per unit is bid for Argentiferous Montana. Stocks of Copper decreased 129 tons and the visible supply 728 tons during last half of April. Chili charters were 1100 tons.

Tin Plate slightly easier, but with good demand for 14 x 20 Bessemer Cokes at 11/3 in Wales. Stocks have increased to 219,000 boxes in the face of recent heavy exports. This is due probably to increased output. The demand for Black Plate is lighter. The Landore Tin-Plate Works have restarted.

Scotch Pig Iron.—Market continues quiet, with prices in buyers' favor.

No. 1 Coltness, f.o.b. Glasgow.....	53/
No. 1 Summerlee, " ".....	49/
No. 1 Gartsherrie, " ".....	47/6
No. 1 Langloan, " ".....	53/
No. 1 Cambro, " ".....	53/6
No. 1 Shotts, " at Leith.....	52/
No. 1 Gtengarnock, " Ardrossan.....	48/6
No. 1 Dalmeilington, " ".....	47/
No. 1 Eglinton, " ".....	43/6
Steamer freights, Glasgow to New York, 2 6;	
Liverpool to New York, 7/6.	

Cleveland Pig.—Business slow and prices easy at 34/, f.o.b. shipping port, for No. 3 Middlesborough.

Bessemer Pig.—Moderate business but prices steady at 46/ for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Ferromanganese.—The market remains quiet but firm. English 80 % quoted at £10. 15/ f.o.b. shipping port.

Steel Rails.—Demand slow and makers' prices unchanged. Heavy sections quoted at £3. 15/, f.o.b. shipping port.

Steel Slabs.—Market very quiet and prices nominal. Bessemer quoted at £4, f.o.b. at shipping point.

Steel Billets.—Quiet market, with former prices asked. Bessemer, 2½ x 2½ inches, quoted at £4. 2/6, f.o.b. shipping point.

Steel Blooms.—Slow business at about former prices. Makers quote £4 for 7 x 7, f.o.b. shipping point.

Old Iron Rails.—There is little doing, but prices are steady. Tees quoted at £2. 7/6 and Double Heads at £2. 7/6 @ £2. 10/, f.o.b.

Scrap Iron.—Demand continues quiet, and prices are unchanged. Heavy Wrought Iron quoted at £2, f.o.b.

Crop Ends.—No change, demand being light. Bessemer quoted at £2. 7/6 @ £2. 10/, f.o.b.

Manufactured Iron.—There has been no improvement in business and very little change in prices. We quote, f.o.b. Liverpool:

Staff. Ordinary Marked Bars	£	s.	d.	£	s.	d.
" Common "	8	0	0	@	6	7
Staff. Bl'k Sheet, singles.....	6	5	0	@	7	10
Welsh Bars (f.o.b. Wales)....	5	7	6	@	5	10

Tin Plate.—Situation about the same as it was last week. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade.....	13/3 @ 13/9
IC Bessemer Steel, Coke finish.....	12/0 @ 12/3
IC Siemens " ".....	12/3 @ 12/6
IC Coke, B. V. grade 14 x 20.....	12/0 @
Charcoal Terne, Dean grade.....	13/6 @ 14/

Pig Tin.—Market closed unsettled. Straits quoted at £92.15/ for spot and £88. 5/ for three months' futures.

Copper.—Market closed steady but quiet. Merchant Bars quoted at £44. 7/6, spot, and £44. 15/, three months' futures. Best selected, £49.

Lead.—The demand has been fair and prices are steady at £9. 12/6 @ £9. 15/ for Soft Spanish.

Spelter.—Demand is fair, and prices remain firm at £18 @ £18. 2/6 for ordinary Silesian.

The St. Louis Car Wheel Company of St. Louis, Mo., have sent forward their exhibit to Chicago, which will be placed in the Transportation Department of the Manufactures Building of the World's Columbian Exposition. They will utilize a space 11 x 16 feet, and will show a full and complete line of all sizes and kinds of cast-iron wheels for use on steam railroads and street-car lines. Their exhibit will consist of both car and engine wheels, from 36 inches in diameter down to 24 inches, both double-plate and spoke wheels; also a complete line of street-car wheels, from 36 inches in diameter to 24 inches, and all classes of smaller wheels, from 22 inches in diameter to 8 inches, the latter being used for coal-mining cars, lumber trucks, &c. This company manufacture wheels largely in contracting chillers (Fawcett's patent), but have recently applied for a patent on a new and improved contracting chiller which will be known to the trade as the Silent Contracting Chiller. Wheels cast in this new improved chiller, without grinding, do not make the buzzing noise in service which is so common with all other contracting chilled wheels. For the

purpose of showing the strength of wheels made by this company, one wheel taken at random was subjected to the C., B. & Q. drop test, and this pounding kept up until a 3 x 3 inch hole was punched out from between each of the 15 brackets. Upon examination it was found that not one of the brackets or plates showed the least defect, except where punched through. This wheel is among their exhibits. For the purpose of showing how nearly balanced this company's wheels are, they send a 33 inch double-plate wheel, which will be placed on horizontal tracks for the inspection of railroad men and others. They will also exhibit a 33-inch double-plate wheel with a one-quarter section sawed out, showing hub, plates, brackets and chill, a practical illustration of the grading of chilled hard iron to soft gray clean plates and solid hub.

### The World's Copper Product.

Henry R. Merton & Co. of London have for a considerable number of years estimated the world's production of copper, giving actual returns wherever available. These figures have been checked and modified by the Geological Survey, whose totals from 1884 to 1891 for the world's production of copper were as follows, the amount contributed by the United States being shown in the second column:

	World's Production. Long tons.	United States. Long tons.	Per cent.
1884.....	213,756	64,708	29
1885.....	225,633	74,052	33
1886.....	214,961	70,430	33
1887.....	223,719	81,017	36
1888.....	259,878	101,054	38
1889.....	258,120	101,239	39
1890.....	268,751	115,966	43
1891.....	273,609	126,839	45
1892.....	310,000	152,625	49

For the years 1891 and 1892 the details are as follows:

	1892. Gross tons.	1891. Gross tons.
Algeria.....	120	120
Argentina.....	200	210
Australia.....	6,500	7,500
Austria.....	*900	965
Bolivia—Cocoroco.....	2,860	2,150
Canada.....	*3,500	3,500
Chili.....	22,565	19,875
Cape of Good Hope—		
Cape Co.....	5,500	5,000
Namaqua.....	450	900
England.....	*700	720
Germany—		
Mansfeld.....	15,360	14,250
Other German.....	*2,600	*2,000
Hungary.....	285	285
Italy.....	2,500	2,200
Japan.....	18,000	17,000
Mexico—		
Boleo.....	6,415	4,175
Other Mexican.....	900	1,025
Newfoundland—		
Betts Cove.....	450	540
Tilt Cove.....	1,940	1,500
Norway—		
Vigsnæs.....	785	615
Other Norwegian.....	*450	*450
Peru.....	290	280
Russia.....	4,300	4,800
Sweden.....	*655	655
Spain and Portugal—		
Rio Tinto.....	31,500	32,000
Tharsis.....	*11,500	*10,500
Mason and Barry.....	*4,400	*4,150
Sevilla.....	1,070	875
Portuguesa.....	*900	890
Other mines.....	*6,800	*5,500
Total.....	56,170	53,915
United States—		
Michigan.....	54,457	50,992
Montana.....	72,020	50,028
Arizona.....	17,159	17,800
Other sources.....	8,999	8,018
Total.....	152,625	126,838
Venezuela—		
Quebrada.....	3,100	6,500
Total.....	310,000	277,968

\*Estimated.

In this table we have substituted for the figures relating to the United States the data presented some time since by the

United States Geological Survey, which are unquestionably as accurate as can be obtained, particularly since gross errors have crept into the estimates of the English firm. The most striking of these errors is that the production of the Calumet and Hecla has been put down as 29,000 gross tons for 1891, and at 26,000 gross tons for 1892. It is pretty thoroughly known in the entire copper trade that instead of a decline in the production there was quite a considerable increase in the output of this famous mine. The foreign firm also estimate a decline in the different sources outside of Michigan, Montana and Arizona, from 8415 gross tons to 7000 gross tons in 1892, when as a matter of fact a conspicuous increase also took place.

### Mesaba Mines.

One of the biggest of the Mesaba range properties is the Mountain Iron Mine, which, together with the Lowmore and Rathvon, lying close beside it and a continuation of its ore body, have in sight 12,000,000 to 14,000,000 tons. The Mountain Iron was the first discovery of merchantable ore on the Mesaba, and was found by Capt. J. A. Nichols in 1888, working for C. C. Merritt, who, in surveying for a railway to the Rainy Lake country, came across indications of iron. The mine was also the first to ship from the Mesaba, sending down 5000 tons last November to the furnaces of Oliver & Co., Carnegie Steel Company and others, as a test of what the range could do.

The mine is located in section 3, 58, 18, and ore is shown in a somewhat irregular deposit 1200 feet wide and 3700 feet long. It is known to be at least 60 feet thick over nearly the entire body. It is being operated on the stripping and open-pit method, and there is now stripped ready for mining a space 2000 feet long and 75 feet wide, while steam shovels are widening the area to 150 feet very rapidly. The average thickness of earth drift and lean ore to be removed before the merchantable ore is exposed is about 10 feet, and stripping has been carried on all winter despite the deep frosts, which, owing to the absence of early snows, were worse than usual. At the mine is now a force of 80 men, two locomotives, two steam shovels and 125 15-ton flat cars. After an area is stripped to the ore bed, a ditch wide enough for a standard gauge track will be cut in the ore and two steam shovels placed in the ditch about half the length of an ore train apart. Trains will be backed down into the ditch and filled by the shovels from the ore body in situ as from a stock pile. That is at least the present calculations, and there does not appear to be any obstacle in its way. The ore body, as so far shown up by both stripping and pittings, will assuredly be easier to handle with a shovel without the use of explosives than was the glacial drift and debris above it.

This company are unable to give the exact cost of the work of stripping, but John T. Jones, who is opening the Biwabic in 3, 58, 16 by the same method and who has spent about \$100,000 so far, tells the writer that the cost of stripping per ton of ore, estimating the ore body to be three times the thickness of the superimposed earth, is about 4 cents, possibly 5. This Mesaba ore weighs just about twice as much as the drift. Some of these properties, among them the Mountain Iron, claim to be able to put the stripped ore on to cars at 25 cents a ton. This mine pays a royalty to the owner of the fee of the land, in this case the State of Minnesota, of 25 cents a ton.

Sixteen assays, for the month of February, showed: Highest, 64.40 and 0.036 phosphorus, and lowest, 63.35 and 0.038. Highest phosphorus was 63.90 and 0.042;

lowest, 64.10 and 0.023. This may be taken as a fair average of the better portion of the ore body so far opened. A sample assayed last week for the World's Fair showed 68.20 iron, 0.018 phosphorus, 1.20 silica, 0.61 manganese, 0.81 combined water.

The mine will ship in 1893 several hundred thousand tons if transportation facilities are found adequate; but so great will be the demands of so many properties on the new railway that shipments of each may be curtailed considerably this year. The company are capitalized at \$2,000,000, and \$400,000 of the stock is yet in the treasury and is expected to remain there. It is owned largely by the Merritt Brothers of Duluth, while the Rockefeller interests, as they are called here, including the Rockefellers, C. L. Colby, Colgate Hoyte, C. W. Wetmore and others of New York, E. B. Bartlett of Brooklyn and others have an interest.

Experiments are being made by engineers of the Tennessee Coal, Iron & Railroad Company to concentrate their iron ore. Encouraging results have been obtained by roasting to magnetic oxide with the waste gas of coke ovens, and following this with magnetic separation.

Fire on the 28th ult. destroyed the machine shops of Chas. F. Hollingshead, at Front and Erie streets, Camden, N. J. Loss estimated at \$5000, fully covered by insurance.

The J. H. & D. Lake Company of Massillon, Ohio, manufacturers of friction clutch pulleys, &c., have sent out to their friends a handy paper weight of glass having on the under side their card and an illustration of their pulleys.

The Sharer Dryer & Construction Company of Philadelphia have just finished the erection and construction of a complete plant for the Powhatan Clay Mfg. Company of Dorset, Va., for the manufacture of all kinds and grades of brick, sewer pipe and drain tiles. It has a capacity on common brick of 80,000 per day. They have also constructed one of their dryers for Adam Weber of Perth Amboy.

The furnace of the Clare Iron Company, at Bloom Switch, Ohio, has just gone into blast for the first time this year.

Mt. Vernon Furnace of the Campbell Iron Company, in Lawrence County, Ohio, which blew out April 1 for repairs, will be ready to start up again about June 15.

No. 3 stack of the Andover Iron Company, Phillipsburg, N. J., has gone out for relining and repairs. All three furnaces of this plant are now idle.

The acceptance test of the 8-inch armor plate for the "New York," "Monterey" and "Texas" was made on Monday at Indian Head. While the contractors failed to secure a premium, the plate filled the terms of the contract, and about 300 tons of armor for the vessels named will be accepted. One of three shots fired passed through the plate and backing, but no crack was developed, and the plate was pronounced very good.

As before announced in these columns, the first annual convention of the National Finishers' Union will be held at Youngstown, Ohio, on Saturday, the 6th inst. At this meeting it is expected that the scale of wages for 1893-4 will be formulated and presented to the manufacturers within a few days. Geo. D. Gessaman, vice-president of the above organization, has resigned his position, to take effect at once. It is stated that Mr. Gessaman, who is a prominent labor leader, will again become a member of the Amalgamated Association.



# HARDWARE.

## Condition of Trade.

**THE CONDITION OF BUSINESS** on the whole is fairly satisfactory, though there has not been as yet that increase in volume which was expected with the advance of the season. This is doubtless in part owing to the continued cold and inclement weather which has prevailed in many parts of the country, curtailing a demand which would have otherwise set in. Many manufacturers, jobbers and commission houses report, however, an excellent business, and in some lines there is certainly a scarcity of goods and manufacturers find difficulty in filling orders as promptly as the goods are required by the trade. In view of the condition of the money market some of the large houses are pursuing a conservative policy in regard to credits, limiting their sales to cash transactions to a greater extent than is usual. It is generally admitted that goods are being sold on narrow margins of profit and that it requires special efforts to keep up the volume of business so as to make it compare favorably with other years.

### Chicago.

(By Telegraph.)

The Shelf Hardware trade has been affected unfavorably by the stormy weather of the past week. Snow again fell in some portions of the Northwest, and salesmen have been very much discouraged by the continuance of practically winter weather. The volume of business shows considerable falling off since our last report. The change to winter weather has checked the demand for Refrigerators, Ice Cream Freezers, Screen Doors and other summer goods, but manufacturers are only now catching up with the heavy orders which were booked some time since. Wire Cloth is scarcer than ever. Jobbers quote \$1.75, but are turning away a great many orders which they find it absolutely impossible to fill. They are endeavoring to take care of their regular trade but find the stock hardly large enough to meet even this demand. Heavy Hardware keeps up remarkably well, considering the unfavorable circumstances; in fact, presenting somewhat of a contrast to the quietness now prevailing in the Shelf Hardware trade.

### St. Louis.

(By Telegraph.)

The bad weather continues to adversely influence the demand for Hardware of every description with the possible exception of Shelf Hardware which continues to move in good volume. The demand for Poultry Netting and Green Cloth continues and prices of both have been sharply advanced, particularly the

latter, which is quoted at from \$1.75 to \$2, but stocks in nearly all sections are being rapidly depleted. Plain Wire, Barb Wire, Wire and Cut Nails are also easier, although no very low prices have yet been made. The general volume of trade for the month just closed shows some falling off in comparison with the same month one year since, but this was caused more by bad weather than anything else. Collections are a trifle slow.

### Boston.

**BIGELOW & DOWSE.**—April has been a very busy month, and it has not been unusual to find houses working overtime to keep up with their orders. For several years past many orders for seasonable goods have been placed and shipped in February and March, while this year the trade have waited as long as possible before buying, and this will naturally increase the sales in the late months.

Every house is short of Wire Cloth, and 2 cents per foot has been offered for large lots for immediate delivery. The jobbing price is \$1.50. Some houses are holding their stock for their own trade, and are not accepting the tempting offers made by outsiders.

It is reported that some Western mill is offering carloads of Wire Nails at \$1.45 at mill. The jobbers' price from store is \$1.75. Barbed Wire is firmer at the mill, but there is no advance made by the jobbers. The demand for Steel Cut Nails is increasing, as customers appreciate now more readily the great difference in cost as compared with Wire Nails.

Many customers who placed early orders for Window Screens and Doors have had their orders filled and are to be congratulated, as the shortage in Wire must necessarily curtail the production of Screen manufacturers who are depending on the factories for Wire. The orders for Screens and Doors are far in excess of former years, and late orders will be hard to fill.

The demand for Bicycles is unprecedented, and there is a short supply of all grades of machines, but more particularly of the cheaper grade. There is a prospect of a very large sale during the month of May.

Stocks of general Hardware are well assorted, but there is difficulty in getting orders filled from the factories on many lines of goods.

### Portland, Ore.

**CORBETT, FAILING & ROBERTSON.**—There has been but little change in the situation in this territory since writing you last. In some sections the matter of collections is entirely out of the question. Particularly is this true of the country east of the Cascade Mountains. Neither banks nor individuals have money to loan, and there is no relief in sight before next harvest is realized on.

Trade is holding its own fairly well, considering that we have an unusually late spring. The crop prospects are still good.

Prices show no change, except a decline of  $\frac{1}{2}$  cent per pound on both Manila and Sisal Rope.

### Cleveland.

**THE W. BINGHAM COMPANY.**—The unfavorable weather has interfered to a considerable extent with trade hereabouts, and while it is fairly satisfactory, it is not up to expectations. There is an immense demand for Wire Cloth, and it is very scarce and held in this market at \$1.75, and, no doubt, will go to \$2 in a very short time. Orders for Steel Goods and other Spring Hardware have fallen off, owing to the backwardness of the weather. Wire and Wire Nails are still in good demand, with prices firm. Bicycles are booming, one peculiar feature of the trade this season being the largely increased demand for Ladies' Wheels. Collections are poor.

### Louisville.

**W. B. BELKNAP & Co.**—There is a most excellent demand for goods of nearly every description, Steel, Wire Nails, Wire, plain and barbed, Poultry Netting and particularly Wire Cloth. This latter article is the scarcest thing in the market, and no price will bring an assurance of prompt shipment. The destruction of one of the factories by fire was most unfortunate. The consumption of Wire Cloth is bound to increase every year for many years to come, as the comfort and luxury of its use become known to the possible users. The youthful negro and the branch of oleander have nearly disappeared from the sunny Southern homes—so the fly has to be fended off in some more modern way. We hope that more liberal provision will be made for the demand of the country next year. There is not much reason in waiting for fly time to come around when it is so absolutely sure to come.

Bar Iron is rather dull, but that is always expected at this time of the year.

The mills will undoubtedly be closed for quite a period this summer in order to adjust the wage scale for the coming year and give people time to go fishing. Meanwhile stocks can be reduced to lighter proportions. We do not fancy that stocks are heavy in the hands of jobbers or warehousemen, but only that Bars just now are a little too easy to get.

Building operations in the city are quite active and rural business, as we have intimated above, is quite large.

It is thought to be a fact that the farmers have ample money for all their wants, but that they have it at home instead of on deposit in the cities. This has affected bank showings somewhat unfavorably. The trouble is not confined to any one part of the country, Mobile and Nashville having had their financial shake up; the center of seismic disturbance seems to have been shifted to Sioux City, not to mention sundry receiverships in the Lehigh Valley and thereabouts.

The great reassuring feature is that values are low. There does not seem to have been any special overtrading or inflation anywhere. There can be no great collapse when there has been no great inflation.

#### St. Paul.

FARWELL, OZMUN, KIRK & CO.—We can report a very backward spring, with the prospect now of more favorable weather in the near future. Heavy rains and snows have fallen, so that not only has the temperature been low, but the whole country has had the ground thoroughly soaked, and a great deal of water is now on the surface, and seeding and other farming operations have been greatly delayed. Of course it is not too late yet for the crop to be sown in ample time if the fall should be late, but it will not get started as early as would be preferred, and farm work is going to come in a lump.

Trade and collections have been largely interfered with by this condition of things, and the business of the month does not close up equal to that of last year; at the same time business might easily be more unsatisfactory, and jobbers are not at all despondent.

Prices have not been subjected to material changes.

#### Omaha.

LEE-CLARKE-ANDRESEN HARDWARE COMPANY.—Business for the past two weeks has not been productive of any essentially important features. The weather has been so continuously stormy that very little activity could be expected beyond supplying the actual necessities of trade. No great activity or rush of business could be expected with the weather so cold as to make it disagreeable to be out, and with the wind at the same time blowing so hard that a man could hardly keep his feet. Notwithstanding these drawbacks the volume of business still continues satisfactory, and by comparison with previous seasons shows a parity if not an excess.

Local enterprises of all kinds are being held back by the cold and blustery weather, consequently city retail trade is dull and quiet and is liable to remain so until atmospheric influences undergo a decided change in favor of bright, warm and spring-like weather.

All the indications point, however, to an excellent demand for all lines of goods as the season advances, with prospects for a very large trade during the coming months.

#### New Orleans.

A. BALDWIN & CO.—Business has been somewhat quiet for the past week or two, and in fact it has almost come to a standstill. We usually look for a considerable falling off at this season of the year, but there seems to be a lack of confidence, and merchants are simply waiting for further developments. The present condition of cotton seems to have depressed a great many of them. However, with all the drawbacks, we must admit that the business for the past month has certainly been more satisfactory than for the same month last year, and our spring business has been much better than we anticipated.

#### Baltimore.

CARLIN & FULTON.—The heaviest portion of the spring trade is now over, though there is a continued brisk demand for many of the staples particularly adapted to the present season.

The extraordinary growth in the sales of all products of Wire, and the vexatious delays on the part of the factories in the filling of orders, have resulted in a very firm and advancing market for all such goods.

A few more warm days and then we may reasonably expect a similar state of affairs with Lawn Mowers, Ice Cream Freezers, Preserving Kettles, and any other goods for which the timid buyer waits upon the weather before purchasing, and then wonders that his order cannot be filled immediately.

Collections are nothing to boast of, though the positive statements now made concerning the national finances may benefit the situation materially.

#### Philadelphia.

SUPPLEE HARDWARE COMPANY.—Trade still continues good, although there seems to be a little hesitancy in placing large assorted orders at present, due, probably, to a large extent to the incessant rain and disagreeable state of the weather. Reports from the salesmen in all sections are of the same nature—cold, rain, storms, &c.

From such weather reports it is not surprising that the retail trade throughout the country hesitate before making heavy purchases. Touching the weather we are having, and in view of the reports made from foreign countries, we might mention that in our own State, during the month of April, the excess of rain was very close to  $1\frac{1}{4}$  inches over that of April, 1892. From London the weather statisticians make the astounding report that in the last 60 days they have had less than  $\frac{1}{2}$  inch of rainfall. In some places in England not a drop of rain has fallen for nine weeks. Similar reports come from Germany, France and other foreign countries, so while our people feel that their lot may have been a hard one, it appears they have been better favored than their cousins.

Our predictions in regard to price on Wire Cloth came true a little earlier than we even anticipated, many dealers holding their quotations as high as 2 cents per square foot, and even at this price it is hard to secure all the Cloth needed.

The destruction by fire of the Clinton Wire Cloth Company, who are reported as about the largest manufacturers, has greatly increased the scarcity.

The trade on Nails and Wire of all descriptions is good at the present time, prices on both lines being held firm at the advance for the past few weeks.

Collections, unfortunately, are below the average.

#### San Francisco.

HUNTINGTON HOPKINS COMPANY.—Trade has been fairly active since our last report, and now that the weather is settled business should be good.

The all-absorbing topic for the past month has been the unsettled condition of the freight tariffs on west-bound shipments, and it has been impossible to make

quotations for importation with any degree of certainty. The war between the Panama Railroad Company, with its connecting lines of steamers, and the Southern Pacific Company is at its height, and rates issued by the latter are as low as the Clipper lines have been making.

For the time being this will cause some shrinkage in the value of stocks, which would be considerable were it not for the fact that for some time nearly all staples and heavy goods have been coming by sail. Notwithstanding the fact that there are many empty houses in San Francisco, new ones are going up and local trade in builders' Hardware is good. Collections are coming in freely from all sections.

### Notes on Prices.

Cut Nails.—The Cut Nail market is not in a very satisfactory condition. There has been some falling off in the demand, so that the volume of business is at present only fair. A weakness in prices has also been developed, and \$1.10 is now named for carload lots at mill, with intimations that in some special cases this figure has even been slightly shaded. The state of the money market has, probably, some effect in producing this condition of things. Small lots from store are quoted at \$1.35 to \$1.40.

Chicago, by Telegraph.—Specifications on Steel Cut Nails have been coming in more freely the past week, indicating a growing consumption. The enlarged business, however, came from outside localities, the trade in this immediate vicinity having been badly checked by the unfavorable weather. Prices are now down to a point below which they can hardly be expected to go, and manufacturers look forward to a very steady business as soon as the weather is in good condition for outside work. Quotations on factory lots are \$1.30 to \$1.35, according to the character of the order. Small lots from stock are selling at \$1.40 to \$1.45.

Wire Nails.—The market continues without open change, the quotation for carload lots at mill being still \$1.55, f.o.b., with Cleveland as the point of equalization for the West and Pittsburgh for the East. It is, however, understood that some sales have been made at \$1.50, this price being apparently confined to the Pittsburgh district. The demand continues good. Quotations on small lots from store in New York are \$1.80 to \$1.85.

Chicago, by Telegraph.—New business in Wire Nails is slow on account of the unsatisfactory weather. In the larger part of last week rain fell almost incessantly, absolutely preventing outdoor work. Jobbers are well fixed with contracts and their stocks will have to be worked off before new orders are given out. The most encouraging feature of the situation is the sale and withdrawal from the market of quite a large stock of Nails in warehouse here, which for a time had threatened to demoralize prices. The rates on factory lots are unchanged at \$1.62 $\frac{1}{4}$ , Chicago. Small lots are selling at \$1.70 to \$1.75 from stock.



**Barb Wire.**—The Barb-Wire market continues without important change and with a fair though not especially heavy demand. We quote \$2.45 to \$2.50 for Four-Point Galvanized in carload lots at mill. Small lots delivered in New York are quoted at \$2.70 for Galvanized and \$2.30 for Plain.

*Chicago, by Telegraph.*—The Barb-Wire trade shows no improvement, conditions remaining precisely the same as last week. Orders are light, but shipments are still fair on old contracts. Factory prices are \$2.20 for Painted and \$2.60 for Galvanized, while small lots from stock are selling at \$2.30 and \$2.70 respectively.

**Wire Cloth.**—There is a continued scarcity of Wire Cloth, and prices are being advanced by jobbers who have stock on hand and also by manufacturers who are in a position to fill orders promptly. In many cases \$2 is demanded and jobbers' quotations are fairly represented by a range of \$1.75 to \$2.

**Bemis & Call Hardware and Tool Company.**—Under date May 1 Bemis & Call Hardware and Tool Company, Springfield, Mass., issue the following revised discount sheet applying to their catalogue and price-list for 1893, terms net cash, 30 days:

No.		Per cent. discount.
6.	Dividers.....	65
7.	Compasses.....	50&5
8.	Calipers, Wing.....	60
9.	“ Double.....	65
10.	“ Inside or Outside.....	65
11.	“ Straight Leg.....	65
12.	“ Call's Pattern Inside.....	55
19.	Punches, Cast Steel Drive (round).....	50&5
23.	“ “ (oval).....	50&5
14.	“ Springfield Socket Drive.....	65
15.	“ Solid.....	35
16.	“ Spring.....	50&5
17.	“ Check.....	55
18.	“ Nail Sets.....	20
20.	Saw Sets, New Patent Lever.....	45
21.	“ Lever.....	20
22.	“ Plate.....	20
23.	“ Spring Hammer.....	30&5
24.	“ New Pattern Hammer.....	45
25.	“ Cross Cut.....	30&5
26.	Timber Scribes.....	30&5
27.	Awls, Scratch (ebonized handles).....	30&5
28.	“ “ (plain handles).....	30&10
29.	“ Belt (plain handles).....	30&10
30.	Screw Drivers.....	30&5
31.	Box Openers.....	65
32.	6-inch Steel Marking Gauges.....	35
34.	Steel Bevels.....	50
33.	Divider Pencil Holders.....	List
35.	Steel Pocket Squares.....	45&5
3.	Steelyards, No. 3.....	5
45.	“ Nos. 4 and 5.....	25
36.	Wrenches, Briggs' Pattern.....	30&10
37.	“ Merrick “.....	45
38-39.	“ No. 2, Cylinder or Gas Pipe.....	45&5
40-41.	“ No. 3, Pipe, Bright.....	55
42-49.	“ No. 4.....	55
43-45.	“ Combination, Bright.....	40&5
44-46.	“ “ Black.....	40&10
47.	“ Extra Heavy.....	45
48.	“ Adjustable S.....	35&5
	Wrench Parts.....	List

**Cordage.**—The Cordage market continues without important change in the matter of prices and with a fair volume of business. There are still current rumors to which we referred some time ago that some prominent outside concerns are likely to be united with the National Cordage Company, but no public announcement of this, if already accomplished, has been made. The National Cordage Company are moving energetically in the direction of European trade, and it is even intimated that Manila Rope has been offered abroad at prices which would almost permit its being reimported from Great

Britain to greater advantage than it could be bought in New York.

**Wringers.**—In the Wringer market there has lately been a good deal of competition and some cutting of prices, so that it has been characterized by some irregularity. As a result of this prices on some leading Wringers are slightly lower. The condition of things is reflected in the fact that the American Wringer Company, 99 Chambers street, New York, have recently reduced the list prices of their No. 2½ Universal, No. 10 Keystone and Nos. 2, 2½ and 10 Novelty Wringers to \$20 per dozen, instead of \$21, as heretofore. It is understood that the Lovell Mfg. Company, Erie, Pa., and the Peerless Wringer Company, Cleveland, Ohio, have lately been adding considerably to their line of Wringers, and the competition between them and the American Wringer Company has been of late more active than heretofore.

**Leather Horse Tie.**—This article was described in a recent issue as put on the market by Covert's Saddlery Works, Farmer, N. Y. The list prices for these Ties are \$8.40 per dozen for 1-inch, and \$10.80 per dozen for 1½-inch, these prices being subject to a discount of 33½ per cent. to the trade.

**Trammel.**—This article, which was described in our last issue as put on the market by Hurley Bros., 223 State street, Hartford, Conn., is listed at \$1.50, subject to a discount to the trade of 40 per cent., with 2 per cent. extra for cash in 10 days.

**Boring-Out or Threading Tool.**—Hurley Bros., 223 State street, Hartford, are putting this Tool on the market, a description of it having appeared in our last issue. It is sold to the trade at \$1.50, subject to a discount of 40 per cent., 2 per cent. additional being allowed for cash in 10 days.

**Lebanon Cake Cutter.**—This article was described in our last issue as manufactured by the Seltzer Specialty Company, Lebanon, Pa. The Cutters list at 15 cents each, or \$1.80 per dozen, and are quoted to the trade at 40 per cent. discount from list, 100 pounds delivered. The Cutters weigh 60 pounds to the gross and are packed four dozen in a case. A sample set will be sent to any address on receipt of the list price.

**Lebanon Beater.**—The Lebanon Beater, put on the market by the Seltzer Specialty Company, Lebanon, Pa., is listed at 50 cents each, or \$6 per dozen. The discount to the trade is 40 per cent., 100 pounds delivered. The Beaters weigh 200 pounds to the gross and are packed two dozen in case, and also half gross if desired.

**Baird's Cooler and Aerator.**—A. M. Coon, Leonardsville, N. Y., is the manufacturer of this article, an illustrated description of which appeared in our last issue. It is sold to the trade at \$3, subject to a discount of 25 per cent.

**Pliers.**—Cronk Hanger Company, Elmira, N. Y., announce a reduction in list on 10 inch Pliers, both Cronk's and Cronk's Button Pattern, from \$21 to \$20.

**Glass.**—The condition of the Glass market is unchanged since our last report. The demand for Glass from jobbers remains quiet, while factories report a fair business. Under the existing condition of trade prices would probably suffer were it not for the Glass associations, which control the market. Since our last report the committee of the National Window Glass Company held a further conference with Glass manufacturers of the Eastern District. Arrangements have not yet been entirely completed for the formation of the Eastern branch of the National Company, so that none of the New Jersey Glass manufacturers are members of the association. It is understood that a meeting of the National Glass Company's Executive Committee will be held in Chicago on May 4, to consider this subject; also to discuss the question of prices and scale matters for next season. The difference in the Chambers Glass Company's new price-list, to which reference was made last week, is shown in the comparative tables given herewith. The diversity in prices applies only to first-quality Glass, single and double, as follows:

SIZES.	Single.		Double.	
	Regu-lar.	Cham-bers.	Regu-lar.	Cham-bers.
6 x 8 to 10 x 15.....	\$12.15	\$13.75	\$17.00	\$18.70
11 x 14 to 16 x 24.....	14.50	15.95	21.00	23.10
18 x 22 to 20 x 30.....	19.00	20.90	26.50	29.15
15 x 36 to 24 x 30.....	20.50	22.55	29.00	31.90
26 x 28 to 24 x 36.....	22.00	24.20	31.50	34.65
26 x 36 to 26 x 44.....	23.50	25.85	33.00	36.30
26 x 46 to 30 x 50.....	26.00	28.60	36.00	39.60
30 x 52 to 30 x 54.....	.....	.....	38.00	41.80
30 x 56 to 34 x 56.....	.....	.....	40.00	44.00
34 x 58 to 34 x 60.....	.....	.....	43.00	47.30
36 x 60 to 40 x 60.....	.....	.....	47.00	51.70

These prices, we understand, are subject to the National Window Glass Company's regular discounts.

There is no change in quotations, and prices on the various kinds of Glass are well maintained. Quotations are as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

## Australasian Axemen's Competition.

REFERENCES HAVE BEEN MADE in former issues of *The Iron Age* to axemen's competitions conducted under the auspices of the Australasian Axemen's Association, Latrobe, Tasmania. The competitions have had a great influence in improving the general style and efficiency of axemanship; and as an association the members have decided upon the form of axe best suited to their requirements. An illustration of this axe was given in our issue of February 9, 1893. Mr. Nichols, the secretary of the association, organized a further competition in wood-chopping and sawing which was held at the

exhibition building, Melbourne, during the Christmas holidays of 1892. The test for the championship between J. M. Marshall, the champion of Tasmania, and T. Reeves, ex-champion, was decided in favor of J. M. Marshall. The blocks were 6 feet in girth. Marshall's time was 4 minutes and 15 seconds, and Reeves' time 4 minutes and 25 seconds. The champion, Mr. Marshall, used an axe made by Fayette R. Plumb, Philadelphia. Mr. Reeves, the ex-champion, used an Underhill axe when he won the championship. These axes are referred to as resembling each other very closely in form and dimensions.

## Southern Hardware Jobbers' Association.

THE ANNUAL MEETING of the Southern Hardware Jobbers' Association was held in Atlanta on Tuesday and Wednesday, April 25 and 26. The wholesale trade of the South were well represented, as the following list of houses and principals in attendance indicates:

Anniston Hardware Company, Anniston, Ala.—J. C. Sproul.  
 Buford Bros., Nashville, Tenn.—Edward Buford.  
 George Brown, Knoxville, Tenn.—John S. Brown.  
 Beck & Gregg Hardware Company, Atlanta—L. H. Beck.  
 Bain & Kirkpatrick Company, Atlanta—D. M. Bain.  
 Brown, Weddington & Co., Charlotte, N. C.—J. S. Weddington.  
 Barney-Cavanagh Hardware Company, Mobile, Ala.—George R. Vaughan.  
 Dudley Bros., Nashville, Tenn.—Major R. H. Dudley.  
 Dunlap Hardware Company, Macon, Ga.—H. M. Worthan.  
 Dickinson Hardware Company, Little Rock, Ark.—J. J. Mandelbaum.  
 Fones Bros. Hardware Company, Little Rock, Ark.—J. J. Mandelbaum.  
 Rome Hardware Company, Rome, Ga.—B. F. Haynes.  
 Towers Hardware Company, Birmingham, Ala.—C. A. Towers.  
 A. M. Tennison & Co., Nashville, Tenn.—Smith Tennison.  
 Vance & Kirby, Chattanooga, Tenn.—J. C. Vance, John T. Vance.  
 Francis-Chenoweth Hardware Company, Birmingham, Ala.—W. A. Chenoweth.  
 Frazier & Dozier, Columbus, Ga.—L. C. Frazier.  
 Green & Caldwell, Chattanooga, Tenn.—W. T. Green.  
 King Hardware Company, Atlanta, Ga.—Geo. R. King, W. T. Newell.  
 Langstaff Hardware Company, Memphis, Tenn.—A. D. Langstaff.  
 S. B. Luttrell & Co., Knoxville, Tenn.—T. C. Luttrell.  
 C. M. McClung & Co., Knoxville, Tenn.—C. M. McClung, W. P. Smith.  
 Macon Hardware Company, Macon, Ga.—L. E. Culver.  
 Moore-Handley Hardware Company, Birmingham, Ala.—B. F. Moore.  
 May & Thomas Hardware Company, Birmingham, Ala.—C. E. Thomas.  
 Orgill Bros. & Co., Memphis, Tenn.—Irby Bennett, proxy.  
 Odell Hardware Company, Greensboro, N. C.—C. H. Ireland.  
 W. W. Woodruff & Co. Knoxville, Tenn.—W. E. Gibbins.  
 Watkins Hardware Company, Richmond, Va.—C. H. Watkins.  
 Watts, Christian & Watts, Lynchburg, Va.—C. M. Watts.

There were also present N. A. Gladding and E. W. Clark representing the Memphis and Chattanooga houses respectively of E. C. Atkins & Co.

The first session of the meeting was called to order by President W. E. Gibbins on Tuesday at 10 o'clock, when the following resolutions on the death of Robert C. Clarke, secretary and treasurer of the Clarke Hardware Company of Atlanta, were read and unanimously adopted:

*Whereas*, on the eve of assembling in this our third annual meeting in the City of Atlanta, we learn with profound sorrow and regret of the death of our esteemed friend and brother Hardware merchant, R. C. Clarke, secretary and treasurer of the Clarke Hardware Company of Atlanta, Ga., a member of this association. Therefore, be it

*Resolved*, That the Southern Hardware Jobbers' Association tender the family of our deceased brother and the corporation of which he was a faithful and efficient member our deepest and heartfelt sympathies and condolence in this hour of their sorrow and affliction.

Resolutions of condolence and sympathy were also passed on the death of Thomas H. Stokes of the King Hardware Company.

At 11.30 o'clock the association adjourned until 12.30 out of respect to Mr. Clarke's family.

In the afternoon they visited the plant of the Southern Agricultural Works, after which another session was held. The evening was devoted to a banquet at the Kimball House, which was marked by a large attendance and much good feeling.

On Wednesday morning at 9 o'clock the labors of the convention were resumed. After some general discussion the meeting adjourned to attend the funeral services of Mr. Clarke, at the termination of which the session was continued. In the afternoon a drive over the city was taken, and subsequently officers were elected for the ensuing term.

During the meeting some important matters were discussed, prominent among which were the government of traveling salesmen and the best method of keeping up stock. It was also determined to appoint a committee to confer with the manufacturers of Steel Plow Shapes for the purpose of trying to bring about a uniform price.

The officers elected for the ensuing year are as follows:

A. D. LANGSTAFF, president,  
 Memphis, Tenn.  
 W. A. CHENOWETH, first vice-president,  
 Birmingham, Ala.  
 W. A. CREGG, second vice-president,  
 Atlanta, Ga.  
 W. P. SMITH, secretary,  
 Knoxville, Tenn.  
 J. C. VANCE, treasurer,  
 Chattanooga, Tenn.

The Executive Committee consists of the officers named above and the following additional members:

C. H. WATKINS, Richmond, Va.  
 C. H. IRELAND, Greensboro, N. C.  
 J. J. WESCOAT, Charleston, S. C.  
 J. J. MANDELBAUM, Little Rock, Ark.  
 LEE RICHARDSON, JR., Vicksburg, Miss.  
 W. H. HUHEIN, Louisville, Ky.

The next annual meeting of the association will be held in Richmond, Va.

A CENSUS of Johnstown, Pa., completed on April 28, shows a remarkable increase in population in the past two years, the city proper containing 25,000 inhabitants.

With the suburbs the total population is 30,150, an increase of 6000 since the flood four years ago, and the rate of growth gains speedily in increasing proportions.

## The Spanish Language in American Trade.

ALTHOUGH the English language is undoubtedly becoming more and more general as a vehicle of business communication the world over, it is none the less true that a great advantage is possessed by those who, in the pursuit of foreign trade, have the command of another language or two. Especially is this the case where the Spanish-speaking people of Central and South America and Mexico are concerned. We are assured that much trade is lost to the manufacturers of the United States through their neglect or inability to communicate with the native merchants of these countries in their own tongue. It is little use sending circulars and price-lists in English broadcast over the Spanish-speaking States of this continent when the large majority of recipients are quite unable to decipher their contents. We are told that complaints are constantly made by merchants in the Spanish-American republics that replies to their letters of inquiry are sent to them in English, which they cannot understand, and of which they are often unable to get a proper translation. Many European, and particularly German houses, wiser in their generation, are enabled to acquire a great pull in this respect by making a rule of conducting all their South American correspondence in the Spanish tongue. This is the main reason why, in Mexico, for example, German goods are so much used, although similar goods of as good or better quality could be supplied from the United States at a lesser cost. The German has, besides studying the special requirements of his customers in Mexico, also studied his convenience in communicating with him in his own language. The invoices of goods going from Germany to Mexico are almost invariably made out in Spanish, so that translations, often involving troublesome errors, delay and loss, are not needed for the Custom House officials, as is the case when invoices in English are used. The Spanish importer, too, does not care as a rule to intrust his correspondence to another for translation, fearing his business secrets may be divulged. Consequently he prefers receiving his communications from abroad in Spanish, and is glad to deal with those who can so accommodate him. This rule applies not only to Mexico, but to all the Spanish-speaking countries of Central and South America, where considerable trade is now awaiting the wideawake United States manufacturer who will conform to the conditions necessary for capturing it. Let the North American Machinery, Hardware or Stove-man, who wants to open up a trade in his goods in the southern portion of this continent, study the Spanish language or get somebody with a competent knowledge of it to conduct his correspondence, and he will assuredly find one obstacle in the way of South American trade will be removed.

## Export Notes.

**G.** W. ROSE of G. W. Rose & Co., Adelaide, South Australia, wholesale dealers in general merchandise, is now on his way to America, via London, partially on business matters and partly to visit the Columbian Exposition. While in this country his headquarters will be at the office of the Sherman & Lyon Company, 100 Chambers street, New York.

The British consul at Maranh, Brazil, says that imports from Great Britain at that port have fallen off 12 per cent. in a year while imports from the United States have nearly doubled. In both instances quoted above the increases are attributed to the reciprocity treaties in force with both countries.

At a recent meeting of the British Associated Chambers of Commerce the president reported that the year had witnessed a shrinkage of £5,000,000 in the British exports to the Latin-American countries, for which condition he held the reciprocity treaties responsible.

The exports of Cutlery from Sheffield to the United States during the quarter ending March 31 amounted in value to \$136,493, an increase of \$24,000 as compared with the corresponding period of last year. Notwithstanding this improvement the Cutlery trade is said to be 50 per cent. below the volume of trade done before the McKinley tariff came into operation. The value of Cutlery exports to this country for the first three months of 1889 and 1890 exceeded \$250,000.

A. J. Kingsland, who now represents a large number of leading American manufacturers in South Africa and Australasia, has concluded an arrangement with the Russell & Erwin Mfg. Company to care for their interests there.

Concerning the recent bank failures in Australia, it is said by merchants and bankers having large interests there that the liabilities of four leading banks which have recently closed their doors aggregate about \$200,000,000, which means that most of the working capital of the country, pending liquidation, is virtually tied up. This will doubtless work much injury among manufacturers who have done a direct business, but not sufficiently large to keep thoroughly posted on the situation, or who have not the assistance of personal representatives on the ground to protect their interests, especially where shipping documents have been surrendered. In Victoria the Government, according to late cables, went to the aid of the banks by declaring a bank holiday of five consecutive days, thus enabling financiers and merchants to look about them and recover their equilibrium. The Premier of South Australia very recently refused to allow one of the leading banks which failed not long ago to remove assets from the colony, and had a local receiver appointed. While panics and failures cannot be said to be beneficial,

much good may be accomplished by clearing the financial atmosphere and establishing values on a sound basis, while the tendency may be to drive large numbers from the cities into the country, where they will be transformed from consumers into producers, thereby contributing to the wealth of the country instead of absorbing it. In stocks, a merchant who not long ago returned from a long residence there said values had been inflated to from three to ten times their real value, while in real estate a fair estimate would be perhaps from five to ten times the present obtainable prices.

## Massachusetts Hardware Dealers' Association.

**T**HE SECOND REGULAR MEETING of the recently organized Massachusetts Hardware Dealers' Association was held, as noted in our last issue, on the evening of April 12 at the United States Hotel, Boston. After a most acceptable dinner President Janvrin called the members to order and introduced as the first speaker the Hon. Charles E. Adams of Lowell, president of the Massachusetts Board of Trade. Mr. Adams had a prior engagement so that he was obliged to leave early, and his remarks were accordingly brief. He congratulated the members on the formation of this association, stating that it was a move in the right direction. He then referred to a bill now before Congress in regard to the consolidation of third and fourth class mail matter into one class, to be known as third class, the rate to be 1 cent for 2 ounces. Mr. Adams suggested that the association should petition Congress through proper representatives in that body for the enactment of the bill. This suggestion was favorably considered by the meeting, and the petition was forwarded in due course. Mr. Adams' remarks were very cordially received.

The next speaker was the Hon. J. B. Sargent of New Haven. Mr. Sargent expressed himself as unprepared to make an elaborate speech, but his felicitous address was listened to with especial interest. We take pleasure in giving its substance, as follows:

I am always glad to be in Massachusetts. To me the old Bay State is holy ground. It was in Boston Harbor that my immigrant ancestor arrived in 1638, and then landed in Boston. Of all the long line of descendants between him and me I was the first to leave Massachusetts as a place of residence.

I am always glad to be in Boston, where more than 50 years ago my business life as a merchant's clerk began on Washington street, opposite the Old South Church, which I never pass without awakening pleasant memories of my earliest business life. And after a rather busy period of more than 40 years as a manufacturer of Hardware I am especially glad to meet the Hardware merchants of Massachusetts, with whom as a class I as a manufacturer have had uninterrupted dealings for more than 40 years, during all of which time no unkind word has ever passed between them and me.

I am glad to meet Hardwaremen in whatever country I may be, and whenever I see the sign Hardware, or any word in any language denoting Hardware, or any emblem or article of the Hardware trade hanging over or about the entrance door, I feel that I have a right to enter, and that I will be welcome—at least if I

show my catalogue and its pictures, be it in a Christian or a heathen land. On entering a Hardware and Tool store in the most northerly of the larger islands of Japan, which foreigners seldom reach, I was surprised to find some shelves full of my own manufactures that the merchant had bought in a far away city of Asia. With my catalogue and my interpreter, and with my own make of Hardware on his shelves, it took but a few minutes to make up a personal friendship between that merchant and myself, and between him and the far off United States of America, which to him had been little more than a myth. He thinks better of America and American civilization by reason of American Hardware and a visit of a live American. Hardware is the best of all missionaries, and a Hardwareman can judge of the condition of civilization of any people by the kind, quantity and quality of the Hardware and Tools they use.

But I am particularly glad to be with the members of the Massachusetts Hardware Dealers' Association on this occasion, its second regular dinner, at which you have met to spend an evening in friendly, social intercourse, and to get better acquainted with each other.

I thank you for the honor of an invitation to be with you, a compliment to me, I presume, as one of the oldest Hardware manufacturers in the country in active business.

I can assure you from my own experience obtained at social meetings of competing manufacturers, that every one of you will be gratified, if not surprised, to find what a lot of good fellows we are, and you will better comprehend the fact that it is very much pleasanter and more profitable to be friendly neighbors in business than inimical competitors. You will learn at the meetings of this association that that cutting "cuss" around the corner, or up or down the street, is a first rate fellow after all. And after a little explanation of misunderstandings you will find that he is inclined to be an honorable, fair-minded neighbor, and quite as desirous of selling goods at a legitimate profit as you are. You will come to the conclusion that cutting prices is the meanest and most unprofitable of all methods of getting new business.

By cutting below a legitimate profit to get a customer, if you get him you get nothing worth having, and when you attempt to restore prices you will lose him. You may spoil your neighbor's old customer for him, but you spoil him for yourself also. You may so demoralize the customer that his trade is not worth having, and the customer becomes dissatisfied with all dealers.

I do not understand the object of this association to be that of advancing prices, but rather that of cultivating such kindly relations and of promoting such social and business intercourse as will tend to steady prices and make them equitable in different localities, and to get a proper and legitimate profit on all articles in the line. No attempts are to be made to advance prices so as to restrict healthy business in the slightest degree, nor to invite new competition.

Many avenues will open up to you through which this association can make itself useful to its members, to the trade and to the country; and whereby you will make the influence and the power of the association felt far away as well as at home.

The measure introduced here to-night, that of the appeal to Congress to have fourth-class mail matter reduced to third-class rates is one example of a useful effort for the public welfare.

I am glad to see some of the wholesale trade present, and regret that there are not more of them here. No class or grade of merchants need have any doubts or misgivings as to the necessity or propriety of their being. No class of them exists unless there is a place for them. Their existence is alone a proof of the necessity or convenience of their existence. Many of the workmen in their unions have

been trying to persuade themselves that they are the foundation and the producers of all things, and that there is no need of any class between them and the consumers or users of the merchandise. Some of the consumers, as well as the so-called producers, talk and write of the uselessness of what they call "the middleman," but the laws of business run the smoothest when there is a proper and natural subdivision not only of the labor of production and manufacturing but of distribution. In manufacturing workmen must have foremen, all must have employers with capital and managing ability. The manufacturer must have merchants to distribute his goods. Under entirely favorable conditions the manufacturer may mainly depend upon nearby retail merchants to distribute his goods. But the wholesale merchant is often of great advantage to the manufacturer in taking large quantities of goods regularly, and especially in relieving the manufacturer during a dull season. The wholesale merchant is often a great convenience even to the retail merchant who buys most of his goods direct from the manufacturer.

The selling by the manufacturer to the consumer is, as a rule, not to the permanent advantage of either unless the consumer be himself a manufacturer needing certain other merchandise or materials in the production of another article. The manufacturer finds from experience that it is for his interest and happiness to confine his sales to those merchants who know their business and who buy in sufficient quantities to make the dealings permanently desirable and advantageous to both sides, taking into consideration all the elements of the cost of doing the business and the necessity of harmony in business relations with the natural distributors of his manufactures, and keeping in mind the sound business principle that local wants should be supplied by local merchants.

I am occupying more time than is my share, and I therefore bring my remarks to a close with thanks for the honor of the invitation to be with you on this occasion.

At the conclusion of Mr. Sargent's remarks, which were listened to with close attention, the president called on some of the members present to address the meeting, and in response Messrs. Dowse, Frye, Thompson, Morss and others entertained the association with the narration of some pleasant incidents connected with their business careers. Mr. Frye of Frye, Phipps & Co. is reputed to be the oldest Hardware jobber in Boston now in business.

The excellent singing of the Amphion quartet was much enjoyed by those present. At a late hour the gathering dispersed, after deciding on May 10 as the date of their next meeting. The association is in a very prosperous condition, and we are advised that applications for membership are constantly coming in.

IN ANOTHER part of this issue the Freeman Wire & Iron Company, East St. Louis, Ill., use a full page, in which they refer to two large warehouses which they have erected on their property, which adjoins their manufacturing plant. They are in a position to supply power, and manufacturers who are on the lookout for a location which is unsurpassed would do well to investigate the locality referred to before making any other arrangements. These warehouses, we are advised, are connected by switches with 28 railroads and there are no bridge tolls to pay on either incoming or outgoing freight. The warehouses are within a short distance of St. Louis and in a splendid location on which to do business.

## Association of American Manufacturers.

THIS ASSOCIATION, the object of which is the promotion of international trade relations, was organized during the return trip of the recent excursion to Mexico, in which some 50 American manufacturers participated, the excursion having been conducted under the auspices of the Australasian Publishing Company of New York. The officers of the association are as follows:

G. MARTIN BRILL, president,  
Philadelphia, Pa.

F. E. MYERS, vice-president,  
Ashland, Ohio.

LUCIUS S. BIGELOW, secretary,  
Box 8, Harrisburg, Pa.

J. HORACE MCFARLAND, treasurer,  
Box 655, Harrisburg, Pa.

The Executive Committee comprises the following gentlemen:

D. R. MORSE, chairman,  
45 Fulton street, New York.

H. W. ANDERSON, Harrisburg, Pa.

E. J. PEARSON, Hartford, Conn.

F. P. WILLIAMS, Brooklyn, N. Y.

F. H. CUTLER, Buffalo, N. Y.

H. J. HEINZ, Pittsburgh, Pa.

J. A. JEFFREY, Columbus, Ohio.

The excursion party above referred to started from New York on January 31 and arrived home on March 7. The manufacturers participating in it represented various lines; indeed, as United States Minister Ryan facetiously said at a banquet given in honor of the visiting manufacturers in the city of Mexico, they "could supply anything from a pickle to a locomotive."

This trip has been graphically described in the interesting series of articles entitled "After Mexican Trade," by William H. Maher, which have recently appeared in our columns. To one of the members of the association, however, we are indebted for the advices which follow, which, as relating especially to this association, will be of interest, although some of the particulars given have already been published.

The actual business capital represented by the party exceeded \$40,000,000, and in nearly every case the principals of the various houses were members of the excursion party. The object of the trip was to look into the possibilities of trade with Mexico and to meet personally the Mexican governors and government officials. In this the excursion was substantially successful, the reception of the manufacturers by the various governors and national government officials being hearty, courteous and gratifying. The excursion party passed through the country from Laredo, via Monterey, San Luis Potosi and Toluca to the City of Mexico; thence eastward after a ten days' sojourn through Puebla and Jalapa to Vera Cruz, where steamer was taken for New York, calling on the way at Merida, in Yucatan, and Havana. The character of the manufacturers' reception by the Mexican officials showed their evident desire for enlarged trade relations with the United States. The immense possibilities of the region traversed, and the manifest benefit which would fall to the lot of both coun-

tries if some substantial plan of reciprocal trade were adopted, combined to render desirable the formation of the association above mentioned, and its organization was effected on shipboard. The objects of this association, as set forth in its by-laws, are the promotion of reciprocal trade relations with all foreign countries, but more especially with the republic of Mexico and the mutual interests of its members. Carefully selected committees have been appointed, and it has been determined to present a strongly indorsed memorial to Congress at next winter's session relative to some advantageous changes which might be made for the benefit of trade with Mexico. The first annual meeting of the association will be held in New York on October 18, 1893.

## The Yale & Towne Mfg. Company's Catalogue.

THE NEW CATALOGUE, No. 14, of the Yale & Towne Mfg. Company, Stamford, Conn., and 84-86 Chambers street, New York, marks a new departure in trade catalogues, a prominent feature of which is their large proportions, which are necessitated by the use of full-size engravings. The catalogue under review is but  $5\frac{1}{2} \times 7\frac{3}{4}$  inches in size, and is thus less than half the size of the catalogue which it supersedes. The company allude to the advantages possessed by a catalogue of these dimensions, not the least of which is the great reduction in cost, which approximates to the reduction in area of page. This, of course, chiefly interests the manufacturer, but the user of the book is also obviously a gainer by reason of its greatly diminished size and weight and correspondingly increased handiness and convenience in use. The catalogue is very handsomely bound in leather and cloth, the engravings being well executed and the typographical arrangement excellent. It comprises 324 pages. The book opens with two pages devoted to the announcement; followed by an alphabetical index, a numerical index of Locks and a numerical index of Hardware. These are followed by an illustrated history of the development of Keys, from the old-fashioned Key to the Yale Paracentric Key. Applications of Yale Mortise and Rim Locks are shown and described, also illustrations with description of right, left and reverse bevel Doors. Prominence is given to defining the word "Paracentric," the name adopted for their new Key. Among the many innovations which are embodied in the book, its make-up, mode of grouping, describing and presenting the varied lines of products are noticeable. At the top of each page the kind of goods described below and the use for which they are intended is noted. Thus Locks for outer doors are grouped on some 50 consecutive pages, including those for front doors, Night Latches, Dead Locks and Store-Door Locks. These are followed by Locks for inner doors, miscellaneous Locks, Cabinet Locks, Padlocks, Keys, Hoisting Machinery, Art Metal Work, Bronze Hardware and Iron Hardware. The plan adopted in getting up the catalogue has



been found by the company to possess many advantages, and in their opinion it will in time command general acceptance. Like most innovations, it may at first be criticised, but the company have faith that the new method is right and will in the end be approved.

## Prize Competitions

### \$25.00.

#### Prize Competition No. 23.

In this series of competitions we are desirous of discussing subjects which will be of practical interest to the trade, with a view to drawing out suggestions and information which will be of service. We are desirous of hearing from the trade in regard to topics the discussion of which would be of interest to them, and we accordingly announce as the subject for Prize Competition No. 23:

#### Three or More Subjects for Prize Competitions.

We do this, hoping to receive from the trade at large many topics which might advantageously be discussed in this way. Many merchants or clerks who may not have the time to discuss trade questions can obviously suggest them, and we shall esteem it a special favor if our readers will mention freely any subjects which seem to them of trade interest.

Some of the subjects which have already been announced have been suggested by our readers.

This competition will remain open until May 27, 1893.

The following prizes will be awarded:

First prize .....	\$12.50
Second prize .....	7.50
Third prize .....	5.00

The prizes will be awarded for answers which in the judgment of the committee of award suggest three or more topics most suitable for discussion in this series of prize competitions.

We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than May 27, 1893. They should be addressed as follows:

DAVID WILLIAMS,  
96-102 Reade street,

New York.

#### Prize Competition No. 23.

The committee to whom the contributions in Prize Competition No. 9 were referred have awarded the prizes as follows:

First Prize of \$50 to ROSS F. RAINEY, Pittsburgh, Pa.

Second Prize of \$25 to W. D. PARLIN, Natick, Mass.

Third Prize of \$15 to JOHN F. JAMES, Roanoke, Va.

Fourth Prize of \$10 to DANIEL P. HOLMES, Norwich, N. Y.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

#### No. 20. Closing May 6.

A Reliable System for Securing the Correct Charging of All Goods Sold on Credit.

#### No. 21. Closing May 13.

The Safety Line in Credit Business.

#### No. 22. Closing May 20.

The Best Manner of Presenting and Collecting Book Accounts.

#### No. 23. Closing May 27.

Three or more Subjects for Competition.

Another subject will be announced in our next issue.

## Manufacturing.

W. R. OSTRANDER & CO., manufacturers of Electric Bells, Alarms, Speaking Tubes and Electrical Supplies, now at 197 Fulton street, New York, have removed to 204 in the same street, a few doors farther toward Greenwich street, on the opposite side.

The American Arms Company, East Boston, Mass., will remove about July 1 to Milwaukee, Wis., where they are building a brick and stone factory 450 x 50 feet, two stories high. The boiler room, engine room and blacksmith shop will be in a detached building. The concern is to be chartered under the laws of the State of Wisconsin and its name changed to the American Fire Arms Company.

I. Bremer, 44-46 Duane street, New York, claims the distinction of being the only manufacturer whose production is confined to articles of Metal, Leather, &c., intended exclusively for the dog. The manufactured articles might be termed dog furnishings, consisting as they do of Collars in a multitude of styles, shapes and sizes, enabling a selection by purchasers of Harness, Locks for Collars, &c., Leads, Bells, Couplings, Boots, Blankets, Combs, Brushes, Dog Baskets, Dog Bracelets, Whips, &c. Collars are now being trimmed with polished Steel, in addition to the customary silver, brass and nickel. A line is also manufactured of attractive Collars of sterling silver for such as can indulge expensive tastes. A recent novelty is a top lock patent Dog Collar so arranged that there is no movement of the lock or swinging motion, thus avoiding noise and the wearing of the hasp. The lock is flat and placed rigidly on a metal loop, which slides over the end of collar, keeping it in place. This lock is made in a number of sizes for small or large collars.

The Ludlow-Saylor Wire Company, St. Louis, Mo., have secured a contract for an ornamental Iron arch for the Kelley Building, Portland, Oregon, and a large number of brass foot rails for the Tacoma Chamber of Commerce. In addition to this work they are busily engaged on a number of large local contracts.

Jno. S. Stevens & Sons of Philadelphia, manufacturers of Architectural and Builders' Iron Work, are adding to their

plant a double-end facing lathe for facing columns, built by the Nicholls & Waterman Mfg. Company of Providence, R. I. It has 62-inch swing, and is 25 feet between centers. This lathe, with the presses and punches recently set up, will considerably increase the capacity of their plant. Among the contracts they are at present engaged on is one for the iron work for the John M. George School at Newtown, Bucks County, Pa.

Wm. A. Shull of Philadelphia has this week shipped a large order covering a line of his Horse Tail Razor Stropps to Dunedin, New Zealand. He has also made recent shipments to Sydney, N. S. W.; Port Natal, South Africa, and to Germany.

The works of the Mann Edge Tool Company, Lewiston, Pa., were completely destroyed by fire on the night of April 13. They had been in operation only about three months and were in excellent condition, with orders on hand, we are advised, for all the tools that could be turned out during the year. The capacity of the works thus destroyed was about 700 Axes per day. The company are already engaged in rebuilding and hope to be in operation again by September. The new plant will be of stone, brick and iron, and the capacity will be doubled. Their present paid-up capital is \$75,000, which will be increased to \$100,000.

Slaymaker, Barry & Co. of Lancaster, Pa., have just taken possession of their new Lock factory, which will give them largely increased facilities and enable them to employ about 200 hands when running full.

Champion Blower & Forge Company of Lancaster, Pa., find the recent additions to their plant inadequate to the requirements of their rapidly increasing trade, and have, therefore, decided on plans for an extension of premises to double what they now are. Work will be commenced at an early date, so that toward fall they hope to be pretty well on to completion.

## Price-Lists, Circulars, &c.

S. T. ALBANS FOUNDRY COMPANY, St. Albans, Vt.: Horse-power Machines. Among other uses to which the company have adapted these machines is that of operating cream separators. Their speed regulator is used in connection with their tread-power machines, which the manufacturers state control the speed as closely as the governor on a steam engine. The company are manufacturing a Baby power to be used for running creamery separators and for doing other light work.

MORGAN & CORNELL, New York: Plain, Japanned, Stamped and Decorated Tin Cans, Grocers' Fine Canisters, Chinese Scenery Paper and Views and Store Fittings of every description. Illustrations are given of Canisters, Spice Cabinets, Tea Bins, Tin Scoops, Fancy Tin Tea Signs, Molasses, Syrup and Oil Cans, Sample Boxes, &c.

IDEAL MFG. COMPANY, New Haven, Conn.: Ideal Tools. Circulars illustrate and describe Loading Flask, No. 3 Special Mold, Cylinder Adjustable Mold, Perfection Mold, Armory Mold, Lyman's Rifle and Shotgun Sights.

BOSTON & LOCKPORT BLOCK COMPANY, Lockport, N. Y., and Boston, Mass.: Wrought Iron and Steel Tackle Blocks, Inside Iron-Strapped and Rope-Strapped Blocks Warehouse Trucks, Car Pushers, Mallets, Wagon Jacks and Faucets. Their 1893 illustrated catalogue and price-list shows these goods in a variety of forms, in a complete and compact arrangement. Their Five-Roller, Metaline Phosphor Bronze, Self-Lubricating Bushed Blocks are recommended by the makers for



rapid and heavy hoisting. Attention is also directed to their Hollow Steel Blocks, also to Steel Snatch Blocks for wire rope.

F. S. HUTCHINSON & Co., Long Island City, N. Y.: Paragon Self-Retaining Dumb Waiters and Hand Elevators. Among the advantages claimed for the Paragon Dumb Waiter is that it holds the car stationary at any desired point, even when loaded to the full capacity of the machine. This is done by an automatic lock, consisting of a side cam and friction clutch. All machines are arranged to work equally well with the weight pocket on either the side or back of the well hole; also to open front and back by using hoist wheel on both ends of the shaft.

## Trade Items.

**UNDERHILL, CLINCH & CO.**, 94 Chambers street, New York, have issued an illustrated circular and price-list of season goods, calling especial attention to Window Screens, Window-Screen Sticks and Brackets, Door-Screen Sticks and Brackets, Window and Door Screen Molding, &c. These are packed in suitable packages, and will enable those who desire protection from flies and other insects, while ventilating apartments, to construct these necessary conveniences at a moderate cost. On the last page an assortment of Spring Hinges for Screen Doors is referred to.

**MARTEN DOSCHER**, 88 Chambers street, New York, who deals in Bench and Molding Planes, &c., and is agent for G. W. Bradley's Edge Tools, has recently been made the sole agent in the United States for Moulson Bros' Plane Irons, which are manufactured in England. He will carry a stock of these goods at the above address, a consignment being now on board of steamer in transit.

**E. LOTHAR SCHMITZ**, 92 Readestreet, New York, who is manufacturing the Fox Safety Razor, has been led by the favor with which it has been received to have it reproduced in fac-simile as a sign, a little over 4 feet in length, which will be displayed over the entrance to his place of business. The parts will be in proportion, and colored to represent the real article.

**THE MARRIAGE** of Herbert M. Bushong of the Reading Hardware Company to Miss Hillegas took place at Reading, Pa., on Wednesday, April 19. Among the wedding gifts was a suite of library furniture in carved oak, from the officers of the company and Mr. Bushong's business associates.

**THE STANLEY RULE & LEVEL COMPANY** have withdrawn their Roofing Brackets from the list of seasonable goods. The numerous uses now made of the Brackets creates a demand for them at all seasons, as explained in the advertisement of the manufacturers. It is intimated that in the Adirondacks they are used to hold up water buckets on the roofs of summer hotels, and in Pennsylvania they were sold during the past winter to keep snow from sliding off buildings.

**VOM CLEFF & Co.**, 105 Duane street, New York, who for the past four months have been introducing a safety Razor, say it is meeting with gratifying success and selling largely. The main feature is the blade, which they say is made of the best steel and mirror polished, with the name Vom Cleff etched on it.

**THE DETROIT CORKSCREW COMPANY**, Detroit, Mich., advise us that their exhibit at the World's Fair will be located in the Manufacturers Building, N. E. quarter, ground floor, Section P, Block 4, No. 86. They will present a full line of Corkscrews and Corkscrew novelties, and will be pleased to have the trade call on them and examine their goods.

**GRAND CROSSING TACK COMPANY**, Grand Crossing, Ill., announce in a circular let-

ter to the trade that they are putting a new brand of Tacks on the market which they call Hardware Tacks. They have discarded the label Swedes Tacks, because under this name almost any weight and grade of Tack can be furnished. The manufacturers state that for general use the Hardware Tack will be found satisfactory, but for the special trades of harness making and carriage trimming they furnish a Tack made from genuine Lancashire Swedes Iron, known as their Swedes Saddlery Tacks, Jayeyesee brand.

**C. E. HUDSON & Co.**, Leominster, Mass., are giving with each gross of their family sets of Hudson's Garden Hose Mender a framed steel engraving, 14 x 17 inches, entitled "The Sleeping Beauty." The picture is referred to as a very attractive one and well deserving of a place in the show window. This picture, unframed, is given away with each box of Menders. The firm are also furnishing 144 of these pictures, unframed, for distribution with the goods.

It is claimed by the manufacturers that the Buck-Eye Pump, owned and made by Mast, Foos & Co., Springfield, Ohio, has the prestige of being the first Pump of its kind, and that it has formed the basis of the most approved modern Pumps. Suit under this patent has been brought by the manufacturers against other Pump manufacturers for infringements.

**THE KNAPP & COWLES MFG. COMPANY**, Bridgeport Conn., in their advertisement in this issue show a large variety of Hardware specialties, including many seasonable goods, and request the trade to send for Catalogue K.

**THE GENERAL FIRE EXTINGUISHER COMPANY** of Providence, R. I., recently organized, are a consolidation of the leading sprinkler concerns of the country and control the principal patents on these devices. Frederick Grinnel is president and F. H. Maynard manager of Eastern department, with headquarters at Providence. The use of automatic sprinklers in the beginning was largely confined to cotton and woolen mills, but now manufacturing establishments in all lines, and especially the metal industries, we are advised, are taking them up.

**THE LUMINOUS BAIT** manufactured by the Enterprise Mfg. Company, Akron, Ohio, is designed to attract fish by its luminous or phosphorescent qualities. It is claimed the luminous breasted cranes wade along the shore at night and through the power of reflection attract the fish, which are thus secured for food. Ocean fish who are so unfortunate as to be phosphorescent in their appearance, it is explained, are devoured by the larger fish on account of their luminosity. These facts are taken advantage of by the above company in manufacturing their bait.

**C. E. HUDSON & Co.**, Leominster, Mass., advise us that Chas. L. Halsted, La Crosse, Wis., is putting on the market a Hose Mending device which is a direct infringement on patents owned by them, and they intimate their intention to take the requisite measures to protect themselves in the matter.

**J. D. WEED & Co.**, Savannah, Ga., have transferred the business management of their interests in this market from J. Hasbrouck, 281 Greenwich street, to L. S. Miller, 97 Chambers street, where in future the headquarters of the firm may be found. Mr. Hasbrouck has been identified with the house since he was 18 years old, between 40 and 50 years, first as a clerk in Savannah, until the war, when he came North. At the close of the Rebellion he was made their buyer here, and has since occupied this position, until now from age and a desire to consult his personal comfort he has asked to be relieved.

OUR READERS will observe the advertisement in this issue of the Warren Axe & Tool Works, Warren, Pa., manufact-

urers of Axes and Tools, including Double and Single Bit Axes, Broad Axes, Hand Axes, Planing Mill Knives, Molding Knives, Machine Knives of all kinds, Mining Picks, Bark Spuds, &c. This new plant is under the management of W. J. Sager, who is referred to as a practical and skilled workman of 35 years' experience in the business. Mr. Sager is the inventor of a new chemical process which is employed in the manufacture of the Sager Special Chemical Process Axe, for which special claims are made. The works are now in operation, and from 40 to 50 skilled workmen will be employed.

**F. A. HERRICK & Co.**, Jackson, Mich., in their advertisement on another page, illustrate their Herrick's patent Tool Rack, intimating also that they can furnish brackets for the wall. It is stated that both sizes of the Rack will be exhibited at the World's Fair in connection with the display of Withington & Cooley Mfg. Company.

**THE PROFUSELY ILLUSTRATED** page advertisement of the Deming Company, Salem, Ohio, will be of interest to the trade, calling attention as it does to the complete line of Spray Pumps, Nozzles, Appliances, &c., which they are putting on the market. The New York office of the company is at 72 John street, Henion & Hubbell being their general Western agents, at 55 and 57 North Clinton street, Chicago.

It is announced that O. Chan: Wells and Charles A. Coutan have retired from the management of the New York house of the Crosby Steam Gage & Valve Company, and have formed the Wells & Coutan Company, with offices at 29 and 31 Gold street, New York. The company will manufacture Standard Steam Vacuum and all other Gages and kindred goods, which department is added to their business. They have also been appointed sales agents of J. E. Lonergan & Co., manufacturers of Pop Safety, Water Relief and Snifter Valves, &c. William A. Locke, formerly salesman with the Ansonia Brass & Copper Company, has associated himself with the new concern.

**GEO. FRIES' SONS** of 909 Filbert street, Philadelphia, makers of Tinware Specialties, are offering a useful line of seasonable goods, including Nursery Refrigerator Kettles, fitted with a movable zinc reservoir for holding ice and a zinc lining so arranged as to allow of  $\frac{1}{2}$  inch of air space between it and the outside body; Tin Butter Chests with ice reservoirs, Cream or Egg Whips, Nursery Refrigerators, Tin Lady Lock Sticks for making pastry, Croquet Molds and Window Mirrors. They state that the season finds them well stocked with the different goods and prepared to execute all orders promptly. As their specialties are favorably known, they will no doubt get a good share of the season's trade.

**THE NEW YORK OFFICE** of the Lufkin Rule Company, Saginaw, Mich., has been removed to 20 Murray street.

**PETER SONNA**, Boise, Idaho, announces that he has disposed of his Hardware and Implement business to G. W. Fletcher, D. M. Steen and George Steen, who have incorporated under the firm name of the Fletcher-Steen Company, Limited. They will handle the same line of goods formerly carried by Mr. Sonna, and will conduct business at the old stand. Mr. Sonna, in the circular announcing this change, takes occasion to recommend the new firm to the confidence of the trade and bespeaks for them a successful and prosperous business career.

**BOAS BROTHERS**, manufacturers and importers of Adamant Enamelled Ware, Hamburg, Germany, announce that owing to the constantly increasing demand for their gray-mottled ware they are removing to larger quarters at 285 Greenwich street, New York, where greater facilities will enable them to fill orders with the utmost care and promptness.

## After Mexican Trade.

By WM. H. MAHER, TOLEDO, OHIO.

### IX.—Working Up Mexican Trade.

I AM REMINDED by a reader of *The Iron Age* in Lockport, N. Y., that my letters will be incomplete without some hints about working up Mexican trade, so I will extend this series one week longer to offer a few suggestions upon this point.

First, as to price-lists and circulars. Of course, these are the easiest way by which to make one's self known to Mexican merchants; it is a cheap way, and a good one, so far as it goes, if done properly.

What shall your list be, English or Spanish?

My opinion is that it is a waste of time and money to send English lists to Mexican merchants and miners. Put yourself in their places. What effect would it have upon your purchasing if you were to receive a price-list of goods that you buy, and it was in the Russian language? You could not read it; you would not pay to have it translated into English; you would examine it with some slight curiosity, and then throw it in the waste basket.

The English language is by no means an unknown tongue to all Mexican merchants. Most of them understand a little; can speak a little, and can read and write a little, but this "little" is not enough to enable them to digest a price-list, as they must study and understand it to effect purchases and sales.

Consequently, if you are aiming for trade in Mexico and other Spanish-American countries, have a price-list in Spanish to send to those countries.

Then bear in mind that the education, both in life and in letters, of the Spaniard teaches him to expect a more elaborate courtesy, even in business matters, than is common with English-speaking people. And this courtesy which he expects from others he returns in all his dealings with them.

Because of this, if I were sending my price-list to a Mexican merchant, I would accompany it with a letter, couched in polite phrase, begging him to receive the list, to examine it at leisure and to favor me with further correspondence regarding my goods, at the same time assuring him that his orders sent to me direct or through his New York agent would be gratefully received and promptly filled. And then I would assure him of my distinguished consideration for himself personally, &c.

Does this seem to you like too much taffy?

It is not "taffy" at all. It is adapting myself to the country in which I desire to trade, and if I am to succeed I must do business in its way; and it is by no means a bad way either. It may be true that "sweet words butter no parsnips," but it is not true that they do not assist in making business and life all the pleasanter. One learns in Mexico that a merchant may be a shrewd buyer, a man of great ability and of great influence, and still it is natural for him to be elaborate in his courtesy to those whom he meets.

Where can you get names of Mexican merchants?

There is no Dun or Bradstreet in that country at present. There is no good list of Mexican merchants to be had, to my knowledge, or was not till within a few days. We have in Washington a Bureau of American Republics, as an outgrowth of Blaine's Pan-American Congress, and this has just issued a printed list of business houses in Mexico, the character of the business being specified. A copy can be had by sending to the head of the bureau, W. E. Curtiss, Department of State, Washington, D. C.

Then bear in mind a point that I ought to have brought out more prominently in my letters, and would have done so but it seemed to go beyond the line I marked out for myself, and that is: The powers that be have much influence upon business matters in Mexico and even in working up trade by price-lists they should not be ignored. So I would have some extra copies of my price-list tastefully bound and would send one of these to each Governor, with a letter begging him to place it in the hands of the chief of the commercial department.

Does this seem to you absurd?

Then I will still further surprise you. Were I to receive an order for goods to-day from some Señor or other in Monterey, of whom I had no knowledge and no references, I would write a letter to Governor Reyes, whose residence is in Monterey, asking him regarding the financial responsibility of this man, and he would have his commercial secretary send me exactly what I wanted. Nor would he think such a request was strange or open to criticism.

The rulers of Mexico suppose that the giving of such information is one of the duties of the position. Some of our Northern Governors might copy the Southern rulers with profit in many things.

This is all that can be done by price-lists and correspondence. What about giving goods to commission men? In every city in Mexico there seems to be a phenomenally large number of commission men, and every manufacturer in our party was importuned for consignments.

This method did not strike me as being a wise one for the Northern manufacturer. He furnishes the goods, almost always has to pay duties, and is taking the whole risk of sales or of having the goods on his hands. It appeared to me that the commission men asked for consignments without having the slightest idea where they could find a market for their goods.

There are some responsible commission men in Mexico, but it would seem as if a Northern manufacturer was not wise to send goods on commission to a country if none of the merchants of that country would invest their own money in such goods.

This brings me to the most promising way of introducing goods and building up trade in Mexico—by traveling men. First, I would strongly recommend every manufacturer to visit Mexico. Our relations with that Republic are growing closer every year. It will be a national crime if ever anything changes this. Northern men go to Europe to see foreign life when there is a world far more strange on this side of the Atlantic. The

trip can be made by land or water; can be made for a few hundred dollars and inside of 30 days, and will give the tourist new ideas about life and trade that will be worth more to him than any European trip of three times the length and expense.

Selling goods by personal solicitation in Mexico is not like doing business in Ohio or Iowa. It is a country where "to-morrow" has great power, but this is not because the Mexican merchant is lazy or dilly-dallies by nature, but because business matters must be seriously considered. A mistake in buying a line of goods there is a much more serious matter than it is with us.

If one of us is caught by a non-salable line of goods he can close it out somewhere at some price. Not so in Mexico. If an article there will not sell, it will not, and that is the end of it.

Often times what appears to be procrastination is simply a way of putting off the negative that the courteous merchant dislikes to give. He prefers to leave the impression on the salesman's mind that he may buy to-morrow, rather than tell him outright that he cannot give him an order.

Trade cannot be built up there by one trip. The merchant will receive him very politely, will give him ample time to tell his story, will listen patiently, and if he declines then to order will do it considerably.

I met traveling men who have been selling goods for several years in Mexico, and they all said that their business in the first year was very light and rather discouraging.

The men who can walk into a store in Mexico and walk out with an order for goods are very few. This is not the way business is done there. It is a country where hospitalities and attentions outside the store count for very much. The merchant accepts attentions, returns them in kind, and his good will is won; trade follows, and being once started continues, for the merchant does not lightly turn from a friend.

What about the language?

The Spanish is a very easy tongue. One who is amply qualified to speak tells me that Spanish is far easier than French, German or Latin. A salesman who is going to the expense of a trip in Mexico can well afford to devote an hour a day to the language for a month before he goes, and this will give him a fair start. The rest will follow as he mixes with the people.

But interpreters can be found in every city at a moderate price, if one does not jump at the first figure, and some of our party who were most successful in taking orders did all their work through the aid of interpreters.

What of the Mexican merchants' responsibility?

The laws of Mexico are framed to punish and not to protect swindling and dishonesty. The laws for the protection of creditors are ample, and beyond that the power in the hands of the authorities is used to protect them without calling upon the slower process of the courts.

In my Chicago paper of to-day is a telegram about a heavy failure in Mexico

and it concludes with this significant sentence:

"The Government has ordered that a strict investigation be conducted into the cause of the failure and the present condition of the concern."

I was told of one dealer who announced that he had failed and could only pay 30 cents on the dollar. The matter was called to the Governor's attention, who summoned the bankrupt before him and demanded a full showing of his affairs, and how the shrinkage could have occurred. Then he had an official take the statement and examine into it, and when the report was made the bankrupt was told he had money concealed somewhere and he might stay in jail till he was ready to pay his debts in full. His wife found means to settle with the creditors at 100 cents on the dollar.

There is no public sentiment in Mexico that encourages a merchant to swindle his creditors, and the courts provide no legal technicalities to assist him in accomplishing the same end.

The American merchant has this in his favor in Mexico: in every city there quite a liberal per cent. of the population is American. The building of the railroads took a great many people from the States down there, who now stay there to operate the roads. In Monterey there are about 2000 Americans; they are well to-do and are influential in business matters, trying all the time to induce the Mexican merchant to provide goods for them that they used to have in the North.

The principal book and notion store there is kept by an Indiana young man. The principal jeweler in San Luis Potosi is a down-East Yankee. In the City of Mexico stores owned and operated by Americans are not uncommon.

English and American capital is turning toward Mexico, and where a people's money goes there the people soon follow. No American need feel lonesome in Mexico. English-speaking people jostle him in the streets and landlords turn away tourists from their overcrowded hotels.

Here is a straw to show the tendency of English and American investors in Mexico, as given us by United States Minister Ryan, lately removed, but much loved by the Mexican authorities: In 1889 there were formed in Mexico 30 English companies, with a capital of £7,955,000, and ten American companies with a capital of \$17,575,000. In 1890 41 English companies, £11,475,505, and 81 American, \$168,305,000, were organized, and in 1892 nine English companies, £2,200,000, and 50 American companies, \$91,625,000. These figures justify all I have said about the coming closer relations with Mexico.

One last question remains to be answered: Can goods be introduced by creating a demand through advertising?

The answer is: No. There is a good field for judicious advertising in Mexico, but this ought to go hand in hand with personal effort. Advertising unaided will accomplish but little. First get your goods in the hands of the dealers and then advertise them, or advertise a few months before you visit Mexico, and this will probably assist you in making sales. But money spent for advertising that is not

followed by personal effort will be money thrown away.

Is the field worth cultivating?

That depends entirely upon what you have to sell.

To the readers of *The Iron Age* who have followed my letters I add that I will be glad to contribute any further information by mail upon special points if I have it, or can get it. I had them in my mind throughout my trip and I have enjoyed preparing these articles for their eyes.

### Another New Steamship Service to South African Ports.

ARKELL & DOUGLAS, 95-97 Broad street, and Barber & Co., 31-33 Broadway, New York, have been made the general agents in this country for a new steamship enterprise, which may be termed the American-South African Service of the Union Steamship Company, direct from New York to Cape Colony, Natal, Delagoa Bay, &c., with monthly sailings. The first steamer will arrive about June 1, and is scheduled to leave June 15 from East Central Pier, Atlantic Dock (adjoining Hamilton Ferry), Brooklyn. The old-established Union and Clan Steamship Companies of England, long operating mail and cargo steamers between London (Southampton) and Glasgow and the Cape, have allocated some of their respective steamers for this line. First-class steamers will be dispatched the 15th of each month, commencing with June, for Capetown, Port Elizabeth (Algoa Bay), East London (inside bar Buffalo River) and Port Natal (Durban), also to Mossel Bay, Delagoa Bay, with through bills of lading to Inhambane, Quillemane, Biera and Mozambique. The first steamer will be the "Arroyo," registering 3664 tons, built in 1890 of steel, with six bulkhead compartments and a carrying capacity of about 5000 tons measurement. It is expected she will make the trip to Capetown in about 25 days. The other steamers so far assigned for the service are the

"Clan Drummond," 2922 tons register, July 15.

"Durban," 2808 tons register, August 15.

"Clan Graham," 2926 tons register, September 15.

"German," 3007 tons register, October 14.

As is well known steamers are gradually supplanting sailing vessels, and while this departure has been under advisement for some time the agents in this city were not sure the time was ripe to inaugurate it. However, as another line has already determined to enter the field, there was nothing to do but follow suit. Rates will be about those now charged for sailing vessels and will be divided into four classifications, the lowest being based on 15 shillings sterling per ton to Capetown; weight or measurement, ship's option, with 10 per cent. primage, freight to be prepaid on receipt of bills of lading unless otherwise arranged. It is imperatively necessary that shippers should have port of destination plainly marked on every package, as much annoyance and expense will be saved thereby.

The lowest rate (fourth classification) will include staples, such as Oil, Lumber, Doors and Sashes, &c. The rate for Port

Elizabeth will be 2 shillings and 6 pence sterling added to the Capetown figures, and a like advance will cover the remaining ports, up to and including Natal, or, in other words, 5 shillings on the Capetown quotation. Arkell & Douglas will attend mainly to supplying cargo, while Barber & Co. will furnish cargo and attend to bills of lading, &c. Should the venture prove remunerative, Arkell & Douglas will gradually withdraw their Merchant Line of sailing vessels for South African ports.

### The Mussey Stone Company.

THE MUSSEY STONE COMPANY were organized at Cleveland, Ohio, on April 15, with a capital stock of \$500,000. The officers of the company are H. E. Mussey, president; Geo. A. McArthur, vice-president, and E. K. Mussey, secretary. The company have opened offices in the Cuyahoga Building, Cleveland. They will make a specialty of Scythe Stones and Grindstones, including mounted. Geo. A. McArthur, vice-president of the company, was for seven years assistant secretary of the Cleveland Stone Company, and was for 20 years connected with the Berea Stone Company. E. K. Mussey has been in the Grindstone business for 20 years, and is well known to the Hardware trade of the United States. The newly organized company will shortly open two new quarries, one at Grafton, Ohio, near the Elyria Stone Company's works, and the other on the Henry Ludwig farm, near the Malone quarry at South Amherst. A sawmill will also be put in at the old Mussey quarry at Elyria to do sawing for window sills, capping and similar work. The quarry land at Grafton contains about 23 acres of a superior kind of stone, which is said to be especially adapted for flagging and sills. The new quarry to be opened at Grafton will be for sawed work exclusively. The stone deposit on the so-called Henry Ludwig farm embraces, we are advised, about 103 acres. Some of this crops out on the surface, but in the main it is covered with soil from 4 to 6 feet deep.

### St. Joseph Pump Company's Fair Exhibit.

THE ST. JOSEPH PUMP COMPANY, St. Joseph, Mo., have erected their exhibit in Agricultural Hall, and, taking into consideration the large number of manufacturers who were unable to obtain space for their exhibits, the enterprise shown by this firm is commendable. The space allowed this concern was secured simply on the merits of the Perfection Elevator and Purifying Pump which they manufacture. The exhibit will occupy a space 10 x 16 feet. The company have erected a platform 7 inches in height, which is covered with a pleasing design of moquette carpet, and inclosing their exhibit is a double railing of antique copper and brass, shaded from a light to a dark finish, which is soft and effective in appearance. The four corner posts are artistically carved, and on the top of each post are acorns finished in bronze. The front posts are 10 feet high, and are connected at the top by a large bar, suspended from which is a glass sign, containing in gilt letters the firm name and the names of the officers and directors. To the right of the entrance to this exhibit is a base 4 feet square by 2 feet in height, on which is erected a cistern, made of a combination of hard wood and

plate glass, which will permit of the inspection of the process by which the Perfection Pump purifies foul water. The wood work of this cistern is finished in pure white, and the decorations consist of marine and landscape scenes, relieved by artistic drawing in pure gold leaf and ebony. The cistern will hold 80 gallons of water, and above it is erected one of their full-sized Perfection Pumps, also made of hard wood and plate glass, handsomely painted in delicate pink and decorated with gold and bronze. This Pump is operated by the full-sized family chain, and will be constantly in motion, thus showing the effect this Pump has on foul water, whether in well or cistern. To the left of the entrance will be found a *fac-simile* of the pump just described, only miniature in form, which will be placed on the desk occupied by T. W. Moore, the company's representative who will have charge of the exhibit. Around these two principal exhibits are placed a number of full-sized Perfection Pumps, painted and decorated and finished equal to that ordinarily given the finest piano. The railing inclosing the exhibit is festooned with chain or buckets used in the Perfection Pump, which tends to relieve the plain appearance of the railing. Taking into consideration that a pump at best is difficult to exhibit, the St. Joseph Pump Company have made an excellent showing, and they will, no doubt, be repaid for the time and expense devoted to it. They invite the trade to visit their exhibit and promise to make it pleasant for all who call.

### Clinton Wire Cloth Company's Fire.

THE RECENT FIRE in the large plant of the Clinton Wire Cloth Company, Clinton, Mass., to which brief reference was made in our last issue, started in the painting department, what is known as the "tower," a building 40 x 80 feet and 185 feet high. A gale from the northwest fanned the flames so that within 30 minutes the fire was communicated to the papering and drying, cloth stock, japanning and inspecting rooms, the Nos. 1, 2 and 4 weaving mills, machine and carpenter shops, and a few smaller rooms. Notwithstanding the rapid spread of the flames, however, the energetic and prompt work of the firemen saved the Nos. 3 and 6 screen cloth weaving mills, the winding, paint grinding, shipping and fine wire stock rooms, the No. 7 hexagon netting mill, the fencing mill, a four-story storehouse, a lumber storehouse, refining and galvanizing houses, perforating mill, three-story office building, engine room and boiler house.

Every department of the works, with the exception of the painting, is now in full operation, and as the painting is being done by the New York Wire Cloth Company under contract with the Clinton Wire Cloth Company, there will be but little delay in deliveries. The total floor area of the plant exceeds 5 acres, but as the burnt area is but little over an acre the company can operate about 80 per cent. of their full area. The most valuable part of the machinery was saved from the flames. It is probable that the

burned portion of the plant will be removed and a new three-story mill, about 200 x 400 feet, erected. This with the buildings now standing will make, the company claim, the largest wire-weaving plant in the country.

The energy thus displayed in starting up the plant is most commendable, and were it not for the large capacity and the abundant financial resources possessed by the company they would not have been able to proceed with the filling of orders with so little delay. As an illustration of the energy and enterprise of the company we may add that two days after the fire four cars loaded with goods were hauled out of the company's storehouse.

### Manufacturers' Difficulties in Freight.

THE EXCESSIVE freight charges and unreasonable regulations which are frequently imposed by railroad corporations in places where there is but one line is a practice which has in not a few instances suggested to the manufacturing concerns thus oppressed the desirability of removing their plant to some point where there are two or more lines of railroads. In some cases this unjust practice has been the means of losing a town a large and important industry giving employment to many hundreds of its inhabitants, so that its disastrous effect is not always confined to the manufacturing concern. A prominent manufacturing company in New England who have for some time been the victims of this practice write us as follows in regard to it:

The subject of moving our works, or the larger part of them, to some point out of New England, has been seriously considered by members of our Board of Directors. Favorable locations have been offered us for consideration, but such would not be considered, for the reason that we would not be bettered in respect to the one point of being entirely at the mercy of one railroad corporation, the same as we now are, since the great consolidation schemes of New England roads have been completed.

The trouble that we have had in manufacturing in New England has not been in any way effected by the tariff question. We are satisfied with its workings. But the exorbitantly high freight rates for short hauls on the railroads for raw material is much more of a tax in New England than any tariff measures.

We have been able, in a measure, to counteract this, but since the formation of what is called the R. I. Car Service Association, with the unreasonable and dictatorial orders and rulings of its agent, who, judging from some of his letters, has a very limited knowledge of the amount of labor required to unload different kinds of freight, and from whose decisions there does not seem to be any appeal, and who has expressed himself that he does not see the reason why scrap iron should not be unloaded as fast as coal, and on account of the impossibility of complying with his ukases and the fact that like many other sections of the country where the car associations make certain concessions on time for unloading coal, iron and such like material, which are refused here by the all-powerful agent, the unreasonable demurrage will so increase the already heavy burden of local freights that in self-preservation concerns moving large quantities of heavy material will be forced to localities where they are not at the mercy of any one railroad corporation, and where the agents and managers of the car associa-

tions have the necessary discrimination and judgment to make their customers feel at least that a fair way of doing business is a mutual benefit.

### Louisville Trade.

(From a Special Correspondent)

THE MONTH OF APRIL has been remarkable for two things—the excessive amount of rainfall for the month, and the extraordinary amount of general business. The Hardware business has enjoyed an incessant run of profitable trade. The jobbers have made good money—they deserve it, too. So far the manufacturers have held prices up remarkably well to the advances, and by degrees the jobbers have succeeded in raising selling prices in keeping. Both, however, were conservative and did not advance prices high enough to scare trade off. The factories are all busy still and prompt shipments are the exceptions on most staple and seasonable goods.

There is no let up on Barbed and Plain Wire. The jobbers seemed surprised that their heavy contracts should not have carried them over. The mills are making good profits now, and this should enable them to close up part of their machinery during the dull parts of the year. They ought not to get gloomy when business slacks up. Wire Nails are freely going out from store and should cause some heavy buying in May. Most dealers had covered for a reasonable spring trade, which runs usually into June, but the demands have been so capricious that contracts are well-nigh exhausted. The dealers have realized nicely on their holdings, none of which were out of proportion, and yet the consumers get Nails cheap enough for any use. Steel Cut Nails are going out in nice orders.

### DeGrauw, Aymar & Co.'s Catalogue.

DE GRAUW, AYMAR & CO., 34 and 35 South street, New York, issue an 1893 illustrated Catalogue and Price List of Cordage, Oakum, Wire Rope, Chains, Anchors, Oars, Blocks, Cotton and Flax Ducks, Russia Bolt Rope, Bunting, Flags, Marine Hardware and Ship Chandlers' goods generally. The contents are arranged in alphabetical order, as, for example, Anchors, Blocks, Cordage, &c., the leaves being indexed through, instead of having an index at the front of the work. It also contains much valuable information, and pains have been taken to have all the tables of weights, strength, &c., absolutely correct. The book is substantially bound in flexible cloth covers, and each alternate page is blank with cross ruling on a fine quality of paper, designed for prices and memoranda.

### It Is Reported—

That the Hardware store of De Grass Bros., Guttenberg, N. J., was burglarized on the 19th ult. and tools valued at \$200 carried off.

That the Hardware store of L. H. Reynolds, Central City, Neb., was recently robbed of a quantity of Revolvers, Knives and Razors.

That A. C. Hucke, Belleville, Ill., is rebuilding the rear portion of his Hardware store, which was recently destroyed by fire. The improvement will cost \$1500.

That A. B. Seale has sold his interest in the E. L. Wilson Hardware Company, Beaumont, Texas, to R. C. McFarlan.

That H. E. Walker and A. J. Walker have purchased the entire interest of Mrs. L. E. Mason in the Hardware business at Woodhull, N. Y.

That the Geo. L. Lenham Hardware Company have been incorporated at Chicago, Ill., with a capital of \$10,000. The



incorporators are Geo. L. Lenham, L. S. Lenham and N. L. Lenham.

That R. L. Tenney will open a Hardware store in Houlton, Maine.

That Wm. Francis has sold his share in the Implement business at Burr, Neb., to Wm Brown, who will conduct it hereafter.

That Wm. Walsh's Hardware store at Pittston, Pa., was slightly damaged by fire a short time since.

That J. P. Watson's Hardware store at Marshall, Minn., was damaged by fire on the 22d ult. Loss, \$1500.

That the Hall & Knight Hardware Company, Lewiston, Maine, are building a large storehouse in the rear of their establishment.

That W. P. Fulton, Hardware dealer at Riverton, Neb., has been succeeded by B. Shaw.

That Wood & Co.'s Hardware store at Cartersville, Mo., was burglarized recently. The stolen booty was of little value.

That the Hardware firm of Smith & Fancher, Bloomingdale, Mich., are building an addition to the north end of their store, 22 x 24 feet.

That the Hardware store of Henry Maher, Allegheny, Pa., was visited by fire on the 24th ult. The flames are supposed to have been due to some defect in the furnace. They were extinguished after the building and stock had been damaged to the extent of \$1000.

That M. J. Miller has sold his interest in the Hardware firm of M. J. Miller & Co., Oneonta, N. Y., to his partner, W. J. Stanton, who will continue the business alone.

That John E. Stowell of the firm of Babcock & Stowell, Binghamton, N. Y., has opened a large store in Elmira, where he will handle House Furnishing Goods, Stoves and Hardware. W. P. Chase of Elmira will act as manager of the new store.

That Lampson & Stimpson have opened their new Hardware store at Rockland, Maine.

That Franklin Cornell has opened a Hardware and grocery store at Newtown, Pa.

That Allen Pease, dealer in Stoves, Tinware, &c., Windsor Locks, Conn., will enlarge his building to meet the increased demands of his business. The addition will be three stories high, 40 x 50 feet. It will be of brick and trimmed to correspond with the present establishment.

That Harford & Son, dealers in Hardware, Pataha, Wash., were burned out on the 6th inst. Loss, \$12,000; insurance, \$8000.

That W. F. Lipke has disposed of his stock of Hardware at Scottsville, Kan.

That Charles Morgan has purchased an interest in the Hardware store of D. A. Ogden, Penn Yan, N. Y.

## Paints and Colors.

*It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.*

Generally speaking, the volume of business in leading lines of Paints and Colors is still somewhat short of meeting expectations and the movement not without signs of being restricted by continued unfavorable weather, to say nothing of the drawback of tight money market upon building operations in this city and immediate vicinity. However, it would appear that many lines of Paints have fared quite as well, if not better, than

they did during the week preceding the one under review. In base materials the movement has been perceptibly larger, and, now that the opening of navigation is likely to bring about low rates of freight to various points, orders for Whiting, Paris White, Putty and various lines of Clays for early shipment are coming along quite freely. There have been few and only unimportant changes in prices during the week.

**White Lead.**—Corroders report a fair average business in their product, and manufacturers of quick-process and mixed Leads uniformly state that their sales have been well up to the average volume for the season. It is quite generally admitted, however, that the conditions alluded to in the general summary given above have checked business more or less and that broader trading can hardly be looked for until the general financial situation becomes less cloudy. In this section irregular prices for corroders' product are still made by some jobbers, but otherwise no "cutting" can be traced. The cheap process and mixed Leads, however, still move from first hands at irregular rates.

**Red Lead and Litharge.**—The higher grades used by the Paint trade are held stiffly at the line of prices that has ruled for some time past and sales are well up to the average in volume, although chiefly of routine character. The lower grades are not as steady in value, since competition is keener, but sales have been quite liberal and the demand is fairly active at the present time.

**Orange Mineral.**—Former prices prevail for both domestic and foreign product. Business is not particularly brisk, but there is enough doing to keep the market in very good form.

**Oxide Zinc.**—Deliveries of domestic on contracts continue free and new orders are of very fair proportions also. That fact alone serves to keep values steady, while reports from the West of enhanced cost of Ores impart something in the nature of decided firmness. Quotations, however, are without change. Foreign Oxide is selling in about the usual way and to a very fair extent. Prices are firm, but unchanged.

**Colors, &c.**—The leading lines of high-grade Colors hold their own in price and meet with very fair sale, but inferior kinds, while enjoying fair movement, sell at irregular figures. Practically the same may be remarked of Oil Colors. Metallic Paints, in large packages, have moved more liberally, and for general line of Mixed Paints there has also been a good demand chiefly for out of town shipment by water routes.

**Miscellaneous.**—There has been a livelier movement in Block Chalk and the market is now strong at \$2.45 @ \$2.50. Over 5000 tons have been sold during the past week or ten days. Whiting has also met with quite free sales and late accumulation of stock has been deeply cut into. Prices are firm and tending upward. Barytes and the general line of Clays are doing better, as far as volume of sales is concerned, but show no change in prices.

## Oils and Turpentine.

About the only features of striking interest in the Oil market are a decidedly firmer feeling on Cotton-Seed product, steadier prices for Lard and some signs of improvement on Cocoanut. The movement in Cotton-Seed Oils is due chiefly to heavy purchases by large Western consumers, and that in turn helped the other lines of goods specified. Generally speaking, business has been of commonplace character, but rather larger the past week than during the preceding one. Weak spots have been scarcer and are very few at the present time.

**Linseed Oil.**—The market is without distinctly new feature. Deliveries have been large, chiefly on old contracts, and sufficient to make considerable impression upon first-hand stocks. New business is represented as being merely fair,

but indications at present are that there will be a livelier demand in the immediate future. That and the fact that the Seed market is in good shape serves to give the market very firm tone.

**Cotton-Seed Oils.**—Heavy purchases of refined product have been made at the Southern producing points for direct shipment to large Western consuming centers. Under the influence of that movement prices have hardened in New York and speculators are bidding as much for 1000-barrel lots as receivers are selling to their regular trade at, evidently with a view to stimulating the New York market. Prime Crude moved from 39¢ to 41¢; prime Summer Yellow from 44¢ to 46¢, and prime Summer White from 48¢ to 49¢ @ 50¢, on the spot.

**Lard Oil.**—The market is decidedly firmer with 85¢ apparently an inside price for strictly prime city-made Oil at the present time. Speculative influences have disappeared for the time being, at least, and the firmness of the market rests upon moderate supplies and good steady jobbing demand.

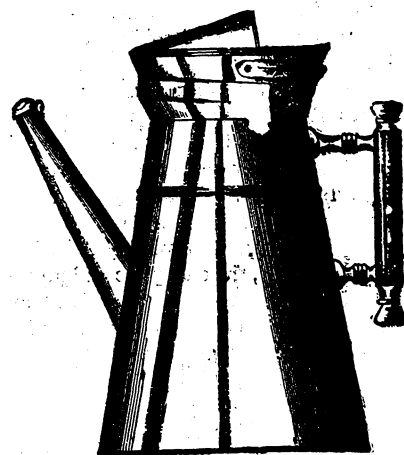
**Fish Oils.**—There has been some little business in Crude Whale Oil for export, at about 45¢. Otherwise the market for Crude products has remained quiet. In Pressed and Bleached Oils about the usual jobbing movement has taken place, chiefly at old prices. Cod Oil is steady in price, but selling rather slowly.

**Miscellaneous.**—Prices for Cocoanut Oils seem to be a shade firmer, as far at least, as holders are concerned, but demand is rather slow. Olive Oil is steady in price but rather quiet. Neatsfoot, Tallow and Red Oils slow at old prices.

**Spirits Turpentine.**—Under pressure to sell, here and in the South, prices have declined sharply. Regular barrels sold at 31¢ and machine barrels at 31½¢ on the spot. At the close there was rather better feeling, the low prices having led to quite free purchases.

## The Abell Coffee Pot.

The Leach Roaster and Baker Company, Paxton, Ill., are introducing the coffee pot as shown in the illustration herewith given. The object sought in the construction of this pot is to have the coffee



The Abell Coffee Pot.

made in a closed chamber, and all steam condensed before it has an opportunity to escape, the condensed steam being conveyed back to the coffee in form of water. The pot is provided with a fine aluminum strainer to prevent any grounds from being poured into the cup. The strainer is removable for cleaning, and being of aluminum does not rust or corrode. The manufacturers state that the pot effects a saving in the amount of coffee used, that the strength of the berry is saved and used, and that there can be no waste, as the steam is condensed and returned to the coffee. The pot is made in two sizes, medium and large.



### Dauntless Bicycles.

The Toledo Bicycle Company, Toledo, Ohio, are putting the two machines herewith illustrated upon the market. The Racer, style D, Fig. 1, has a single tube frame of Mannesman spiral tubing, the

wheel they advanced a little ahead of the times in giving the rider a position which he can rarely find, and that this feature has been greatly appreciated. They also state that with considerable rake and a 10 $\frac{1}{4}$ -inch head it makes a most excellent steering wheel and can be ridden hands off by a novice. Guards and front brake

minute. Attention is called to the fact that the beater has a tight fitting cover which prevents spattering, also of dirt or flies getting into the substance being beaten. The graduated jar is for use as a measure, the sides having marks by which

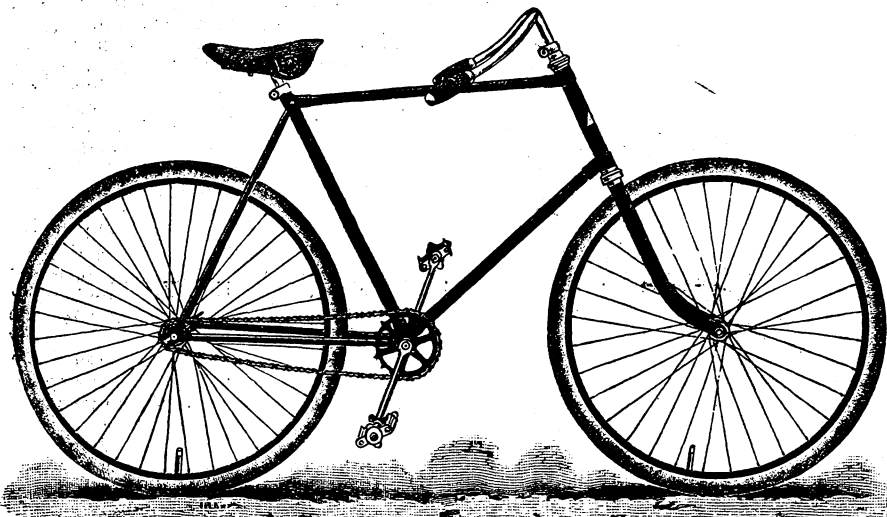


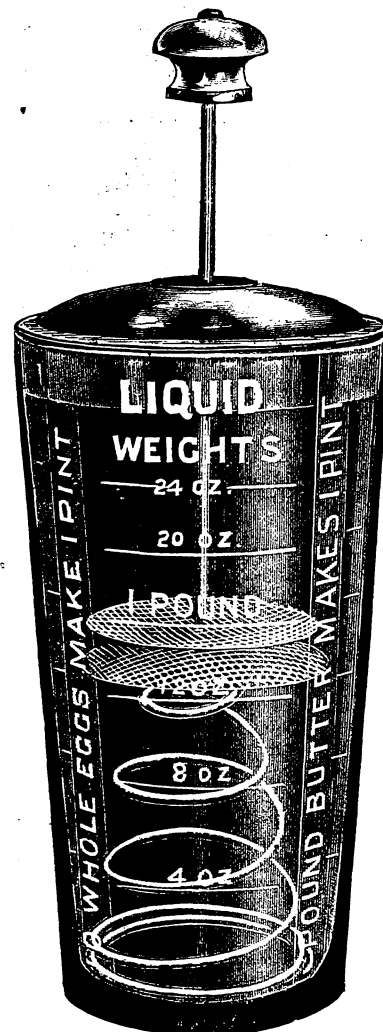
Fig. 1.—Dauntless Racer.

perfect diamond high reach, 10 $\frac{1}{4}$  inch head; with all steel forgings, including yoke. The wheels are both 28-inch, fitted with Morgan & Wright or Ideal tires. It has improved rat-trap pedals, and removable dust-proof bearings. The manufacturers claim that the machine has a small tread, that it will not flinch in a heavy spurt, and that it has all the get-there qualities that characterize a modern racing wheel. The Scorchers, style E, Fig. 2,

can be attached if desired at no extra charge.

### Lightning Dasher and Egg Beater.

Lightning Dasher Egg Beater Company, Orange and Erie streets, Toledo, Ohio, are introducing the above article as illustrated herewith. It consists of a graduated glass jar, having a closely fitting cover, and a dasher, as in a churn. The eggs,



Lightning Dasher and Egg Beater.

weights or measures of liquids, flour, sugar, &c. may be determined. The manufacturers recommend it as an egg beater, cream whipper, lemonade and eggnog mixer, and as an ice cream freezer.

### Good Luck Ice Cream Freezer.

The accompanying cut illustrates a freezer put upon the market by Charles W. Packer, 20 North Fourth street, Phila-

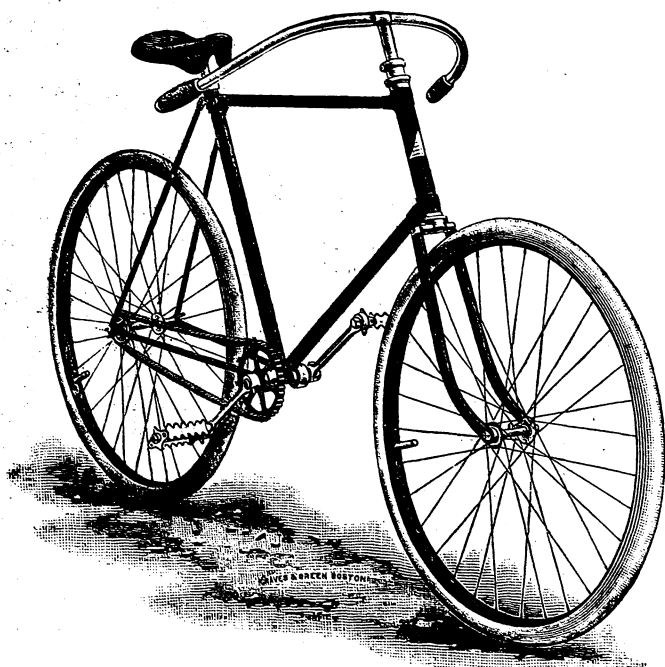


Fig. 2.—Our Scorchers.

is the same in material and construction as the wheel already described, with a 45-inch wheel base, 10 $\frac{1}{4}$ -inch head, special tool bag, B. & S. wrench, Persons & Muller racing saddle or Garford scorchers saddle, either drop or straight handle bar, round crank, 6 $\frac{1}{4}$ -inch stroke, geared to 60 inches, and weighs 30 pounds. The manufacturers state that in building the

cream or other substance to be beaten is put into the jar, the lid pressed into place and the dasher pushed down by the hand of the operator, the coiled spring returning it again. This action, it is explained, forces the contents of the jar through the perforation of the double dasher, and that it will satisfactorily whip the most refractory eggs or cream in one



Good Luck Ice-Cream Freezer.

delphia, Pa. The freezer is being made in response to a demand for a low priced freezer with covered gearing. It is remarked that in other respects it resembles

the Standard Freezer manufactured by the same maker, and that it embodies all the latest improvements, including the automatic double-acting vibratory scraper, which, it is stated, closely fits the can and thoroughly scrapes it during the process of freezing.

#### Wizard and Sultana Gas Stoves.

The accompanying illustrations represent gas stoves put on the market by William Vogel & Brothers, 37-47 South Ninth

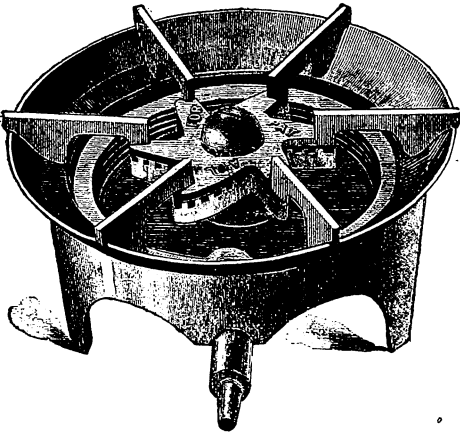


Fig. 1.—The Wizard.

street, Brooklyn, N. Y., as agents for H. Clayton & Co. In construction the burners of the two stoves are the same, being star-shaped with perforations around the upper edge of the star, also perforations around the lower edge of the cap in the center. The Wizard is 4 inches high and 8 inches in diameter. The Sultana, Fig. 2, is the same height, with a base 12 x 22 inches. The manufacturers claim for these stoves

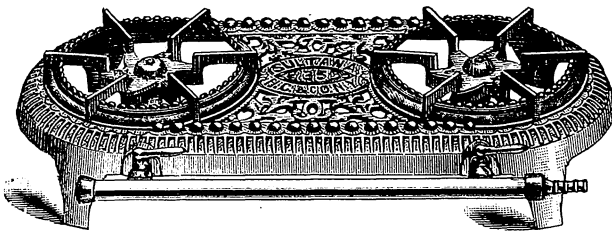
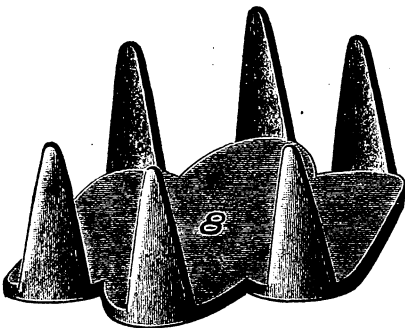


Fig. 2.—Sultana No. 35.

perfect combustion and freedom from smoke or odor.

#### The Kenehan Improved Soft-Steel Belt Fastener.

The accompanying cut represents belt fasteners offered by The Akers Novelty Company, Cleveland, Ohio. They are de-



The Kenehan Improved Soft-Steel Belt Fastener.

scribed as being of one piece of soft steel, cut and formed with perfect dies, each fastener being perfect and possessing the requisite strength for holding the belt. The manufacturers claim that the fasteners

have withstood the most severe tests; that they can be used where tightener or idler pulleys are used; that they run over either large or small pulleys as smoothly as cemented belts, and that but a short time is consumed in making a connection with them. The cut shows the exact size of the No. 8 fastener, designed for 5 and 6 ply rubber and double belts. Seven other sizes are made, down to and including fasteners for light, narrow, single belts.

#### Vanderbilt Sash Balances.

The sash balances illustrated herewith are offered by the Vanderbilt Sash Balance Company, Canandaigua, N. Y., for whom



Fig. 1.—Vanderbilt Side Balance.

Harmon & Dixon, 118 Chambers street, New York, are agents. The working parts are entirely inclosed, as a protection



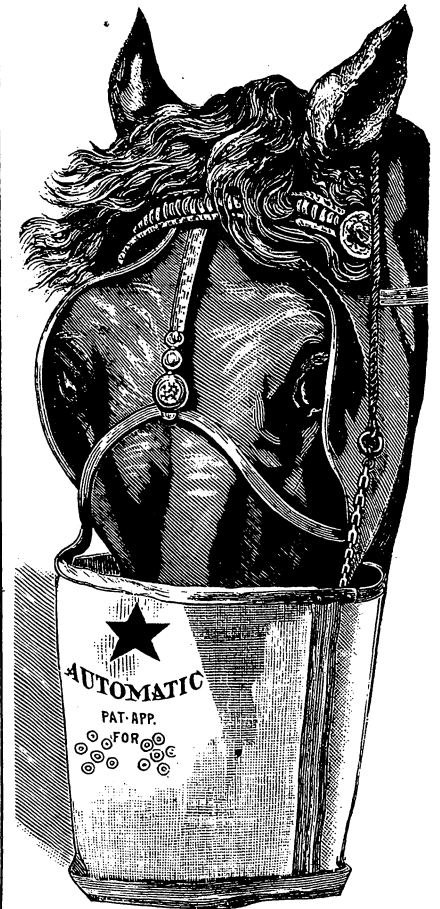
Fig. 2.—Vanderbilt Top Balance.

bronze, the combination of the two metals giving, it is stated, superior tensile strength. The sash iron on the end of the band is inserted into an ordinary auger hole in the sash, the point being made

that it requires no screw or staple to hold it in place. The manufacturers claim that the balance overcomes the varying pull on the sash without retarding the action of the spring, and that there is no friction on the spring. The balances are made for sash weighing from 4 to 100 pounds, and can be used on new or old windows. The side balances, Fig. 1, are designed to be mortised in the frame in the same position as an ordinary cord pulley. The top balances, Fig. 2, are mortised into the top of the frame and are used in windows where there is not sufficient room on the sides.

#### The Star Automatic Feed Bag.

The accompanying cut represents a feed bag being put upon the market by the Star Automatic Feed Bag Company, Foxboro, Mass., with New York office at 95 Broad street. The rope going over the horse's head is attached to brass safety chains, one each side, which in turn are fastened to coil springs. The springs at their lower ends are attached by means of



The Star Automatic Feed Bag.

leather tags to the bottom of the feed bag. The springs and chain within the bag are contained in tin tubes, which are covered on the inside of the bag by sheathing, thus protecting them from the feed. By means of the springs the bag adjusts itself when in position, so that the animal's lips are in contact with the feed, until, it is stated, every particle is consumed, not a grain being wasted. The makers remark that although the bag is intended for outside use it is superior to the stationary feed trough. The bag is made in two sizes, 4 and 6 quarts, with both wood and leather bottom, and with canvas and leather sheathing covering the spring casings.

### The Twin City Truck.

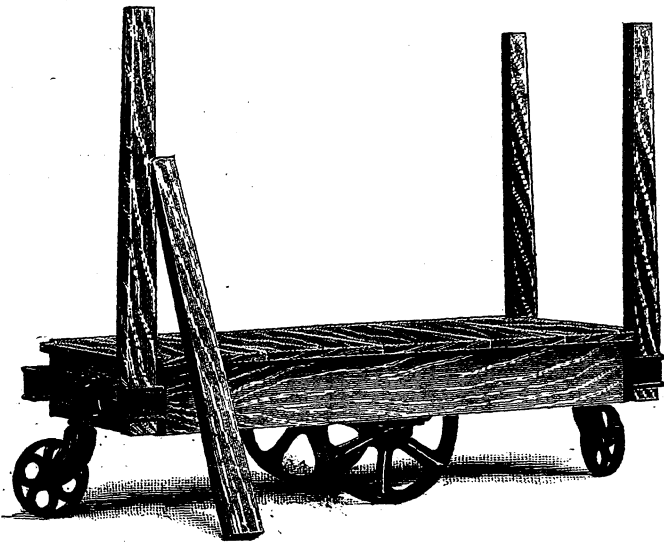
Sweatt Mfg. Company, Minneapolis, Minn., are introducing factory, warehouse and store trucks, as illustrated herewith. The material of which the trucks are made is rock elm with castings of the best quality, containing, it is stated, enough metal to carry any weight, and in which strength is not sacrificed to gain lightness. Attention is directed to the combined corner and stake iron, together with the casters, and to the method of construction, whereby a truck can be knocked down or set up without the use of a wrench. The

or crush the pipe, and that it performs the office of a nut wrench equally as well, combining simplicity and strength with quickness of adjustment. The wrench is interchangeable in all of its parts and designed to meet the wants of machinists, engineers, mechanics, &c. The wrenches are made 10, 12 and 15 inch, to take pipe from  $\frac{1}{4}$  to 2 inches.

### Wire Glass.

C. S. Weber & Co., 415 Broadway, New York, inform us that they have been appointed general agents in New York, New

Jersey, Delaware and the New England and South Atlantic States for the American Wire Glass Mfg. Company of Philadelphia. "Wire Glass," the new architectural medium, of which an account was given in a former issue, appears to have been received with great favor by architects and builders. George Hayes, a well known authority on fire proof construction, says: "Glass having a woven wire imbedded therein is substantially fire proof. Glass, when attacked by fire, coming in contact with water will fly into small particles, becoming entirely disintegrated, and will leave any opening which it has filled entirely unprotected. But when woven wire is incorporated, as in the substance known as wire glass, the particles will be most effectually held together, and will protect an opening, resisting the spread or communication of fire. This material would be specially useful in the protection of exterior openings, and would avoid



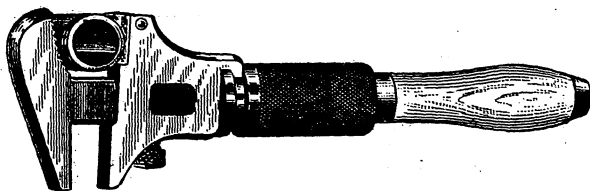
The Twin City Truck.

trucks are made in three sizes: The No. 1, shown in the cut, being the standard factory truck. This has a platform 27 x 48 inches with center wheels 14 inches in diameter, 24-inch face and 6 spokes. The axle is of 1 inch rolled steel, and has a 7-inch wheel in the casters at each end. The No. 2 truck is built upon the same general plan as No. 1, but is designed for heavier work. The platform of No. 2 is 30 x 60 inches, with a swivel caster at each corner. These trucks are designed for warehouses, mills, commission houses, &c.

### The Trimont Combination Wrench.

Trimont Mfg. Company, Amory street, Roxbury, Mass., are introducing the above tool, as herewith illustrated. It is made with a long sleeve nut and oval threads, the latter being a feature common to all Trimont wrenches. When used as a nut

wrench the thumb nut is tightened, which does not interfere with adjusting the jaw to the size of nut, but obviates all play or looseness of the movable jaw upon the bar. When used as a pipe wrench the screw is loosened, thus giving the movable jaw perfect freedom to take hold and release. When releasing the pipe it is not necessary to unscrew the wrench, as it releases as soon as the pressure ceases. The pipe side of the movable jaw has a toothed piece held in place by a pin, which can be replaced when desired. The manufacturers claim that the wrench does not slip, lock,



The Trimont Combination Wrench.

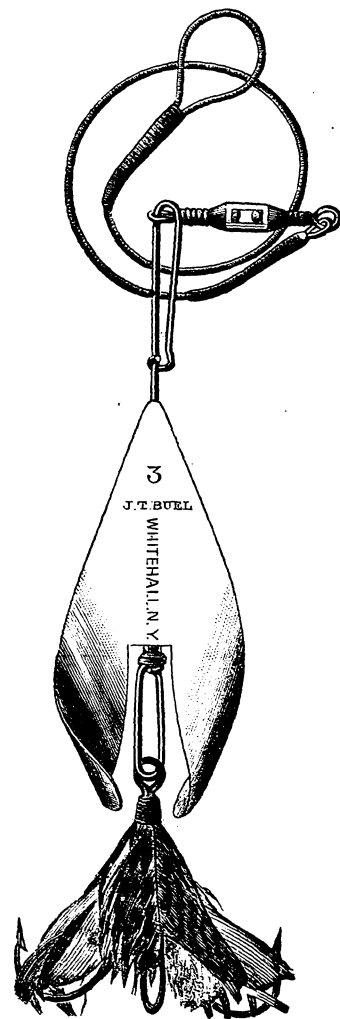
the necessity of cumbersome iron shutters, which are more often neglected than used. A skylight, or glazed roof composed of hollow rafters and glazed with wire glass, will hold out against fire as long as any other portion of a building, giving a thorough protection at a point hitherto the weakest feature of a structure. Besides this, a sure prevention of falling glass by ordinary breakage will be acquired."

The first invention of wire glass, as now made, was due, as we have before mentioned, to Frank Shumann of Tacony; but the circumstances which led to his inven-

tion have not, we believe, been previously noticed. It appears that President Roberts of the Pennsylvania Railroad Company, applied unsuccessfully to the glass manufacturers for a glass stiffened with wire. Mr. Shumann, however, tackled the problem and successfully solved it, and an order for 200,000 square feet of wire glass was placed with his company by the Pennsylvania Railroad Company for their Broad street station at Philadelphia. This one order will give two months' employment to the new manufacturing plant which the American Wire Glass Company have erected at Tacony, near Philadelphia. The works are nearly completed, and will, we understand, be ready for operation soon after May 1. They will run eight pots with a total capacity of 5000 square feet of glass daily.

### Buel's New Spinner.

The trolling spoon illustrated herewith is being offered by the J. T. Buel Company, Whitehall, N. Y. The spinner

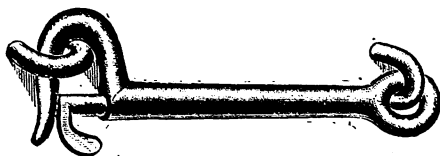


Buel's New Spinner.

turns on a wire that has snaps at the ends, allowing the changing of the hooks and swivels without the use of pliers. Thus should a hook be broken it may be readily and easily replaced. The spinner is made in nine sizes. The original spoon invented by J. T. Buel in 1834, consisted of an old brass table spoon which he polished on the convex side of the bowl. He then soldered a single hook upon the small end of the bowl, and attached the line to the handle, which was broken off to about half of its original length.

Covert's Self-Locking Gate and Door Hook.

Covert's Saddlery Works, Farmer, N. Y., are putting the above hook on the market as herewith shown. The makers claim that the device positively prevents unhooking from the opposite side, through a crack or narrow opening, and that it



Covert's Self-Locking Gate and Door Hook.

can never become loosened or unhooked through accident. The hook can readily be attached to a gate or door, the same as an ordinary hook and staple. They are made in 4 and 6 inch sizes finished in C-plate; staples with the same finish are furnished with the hooks.

Ridgway's Observation and Ventilation Lock.

John J. Ridgway, 10 and 12 Vandewater street, New York, is introducing this lock as shown in Fig. 1. It consists of a flush extension bolt with bolt cases to be screwed to the inside of the door. The jamb plate is fastened to the jamb of the door directly

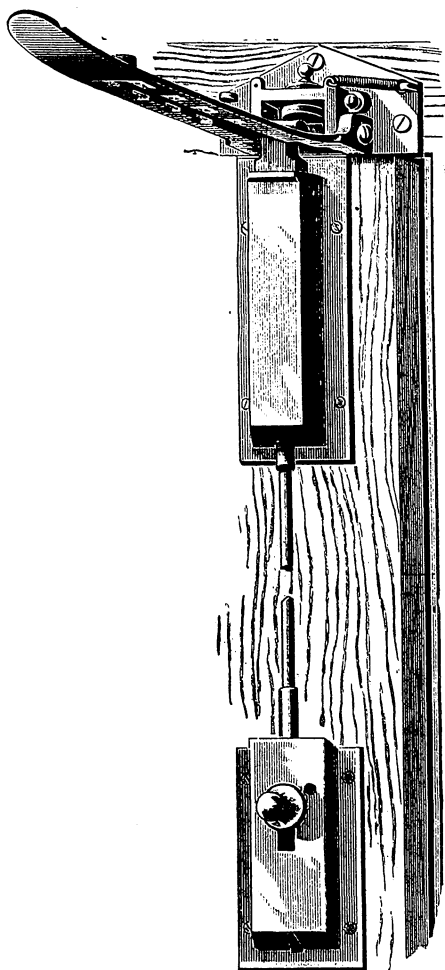


Fig. 1.—Ridgway's Observation and Ventilating Lock.

over the bolt and the hinge plate to which the slotted arm is pivoted is hung in the jamb plate by means of a pin. The coil spring at the side of the jamb plate may be attached to either side, as required for right or left hand doors; being shown in the cut as adapted for a right hand door. The set screw immediately under the coil

spring is set to prevent the coil spring from pulling the hinge plate and slotted arm far enough around so as to cause the bolt to bind in the slot of the arm as the door is opened or closed. The bolt is actuated by springs, so as to always be engaged in the slot of the arm unless locked off, and the arm remains in a position to always clear the top of the door. At the bottom of the lower bolt case is a lock-off catch, so that the bolt may be fastened down free from the arm, and under the knob are notches, one on each side of the perpendicular slot, into which the knob slide is pulled to lock the bolt in the slotted arm. In operation the bolt is allowed to pass through the opening in the slotted arm as shown in Fig. 1, this opening being the only one in the arm through

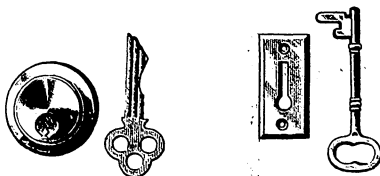


Fig. 2.—Keys and Escutcheons.

which the bolt can be introduced into the slot or withdrawn from it. The door is then opened from 1 to 5 inches, the bolt pulled down into any notch in the arm to hold the door open as desired, and the knob pulled out into the notches in the lower bolt case, thus locking the bolt. Thus the lock acts as a chain bolt, with this advantage, however, that the door cannot be blown shut. Should a tramp or burglar reach his arm in and release the knob, he could not gain an entrance to the house or room, as the bolt cannot be withdrawn from the arm except from the inside, and then only by shutting the door, which brings the bolt to the opening in the slot of

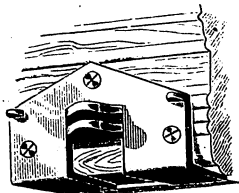


Fig. 3.—Graduated Jamb Plate.

the arm, when it can be pulled down by means of the knob. To open the door from inside to admit a visitor, the door is closed, the bolt pulled down by the knob out of the arm, but not locked down, and the door opened. When the door is closed the top of the bolt slides along the lower side of the arm until it comes to the opening, when the weight of the arm causes it to automatically drop over the bolt, thus preventing any one entering from the outside. The door may then be opened for ventilation as before. The opposite side of the lower bolt case is provided with escutcheon and key, two forms of which are shown in Fig. 2, so that the door may be locked open for ventilation at night, or in the absence of the family, and entrance can be gained only by those having a key. The graduated jamb plate, Fig. 3, obviates cutting the trim, except at the center of the plate, to allow room for the bolt. The device allows the door to be locked open with perfect safety to the inmates of the house or room, and also allows those inside to observe who persons outside are before admitting them. The lock, as sent from the factory, is adapted to any door of any height and of any swing. The connecting rod between the upper and lower bolt cases has a continuous thread, which is an ornamental feature, and may be cut to such a length as to allow the lower bolt case to be put on the door at any distance

from the floor desired. The goods are regularly finished in golden-bronze, but can be ordered in any finish.

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**Halters—**

Covert's, Rope, Jute.....	60&10&10&25
Covert's, Rope, 7-16 in., Jute.....	70&25
Covert's, Rope, 1/4 in., Hemp.....	60&25
Covert's, Ad. Rope Halters.....	40&25
Covert's, Rope Horse and Cattle Tie.....	50&10&25
Covert's, Jute Horse Ties.....	70&25
Covert's, Jute Cattle Ties.....	70&10&25
Covert's, Ad. Web Halters.....	35&25&25
Covert's, Saddlery Works Halters.....	35&25
Covert's, Saddlery Works Horse and Cattle Ties.....	35&25

**Hammers—****Handled Hammers—**

Maydole's, list Dec. 1, '85.....	25&10&35
Buffalo Hammer Co.....	50&10
Hudson & Beckley.....	50&10
Alpha Tool Co.....	50&10
Verree.....	40&10
O. Hammond & Son.....	40&10
Fayette R. Plumb.....	40&10
Artisan's Choice, A. E. Nail.....	40&10
Regular Y. P. A. E. Nail.....	50
Horseshoe Tapping Hammers.....	50
Other Hammers.....	50&10
Cheney's Claw.....	40&10
Cheney's Machinist's & Riveting.....	50&10
Magnetic Tack, Nos. 1, 2, 3, 1.25, 1.50 & 1.75.....	30&10
Nelson Tool Works.....	40&10
Warner & Nobles, New Hat.....	25&10
Peck, Stow & Wilcox.....	35&40
Sargent's.....	40&10&10

**Heavy Hammers and Sledges—**

8 lb and under.....	75&10&75&10
8 to 12 lb.....	85
Over 12 lb.....	85
Wilkinson's Smiths.....	10&10&11

**Handcuffs and Leg Irons**

—See Police Goods.

**Handles—****Cross-Cut Saw Handles—**

Atkins' new list.....	40
Champion.....	15
My's Perfection.....	doz., \$3.00

**Iron, Wrought or Cast—**

Door or Thumb.					
Nos.....	0	1	2	3	4
Per doz.....	\$0.90	1.00	1.08	1.35	1.50
					60&10&10%
Roggin's Latches.....	doz 30&	35&			
Bronze Iron Drop Latches..	doz 70¢	net			
Jap'd Store Door Handles--Nuts,	1.62;				
Plate, \$1.10; no plate, \$0.88.....	net				
Barn Door, 70¢	doz \$1.40				10&10%
Chest and Lifting.....					70&70&10%

**Brittan, Graham & Mathes, Hist Jan.**  
1890. 60&10&10%  
Plate. 33&40%  
Barnes Mfg. Co. 40&40&10%  
Yale. net prices  
Delta Flat Key. 36%  
Romer's Night Latches. 15%  
Brooklyn Latches. 50&10%  
Warner's Burglar Proof. # doz. \$8.00, 50%

### Padlocks—

List June 10, 1891. 50&2%  
Norwich Lock Mfg. Co., old list. 50&2%  
Yale Lock Mfg. Co.'s. net prices  
Eagle. 40%  
Eureka, Eagle Lock Co. 40&2%  
Romer's Nos. 0 to 21. 30%  
Romer's Scandinavian, &c., Nos. 100 to 606. 15%  
A. E. Deltz. 40%  
Champion Padlocks. 40%  
Hotchkiss. 30%  
Star. 60%  
Horseshoe. # doz \$9.50 50&10%  
Barnes Mfg. Co. 40&40&10%  
Nock's. 30%  
Scandinavian. 90&40%  
E. T. Fram's Keystone Scandinavian. Nos. 119, 120, 130 and 140. 90&10%  
Other Nos. 65%  
Ames Sword Co. up to No. 150. 40%  
Ames Sword Co. above No. 150. 50%  
Blaymaker, Barry & Co. No. 1010 line. 90&5%  
No. 41 line. 50&5%  
No. 61 line. 60&5%  
No. 21 line. 75&10%

### Sash, &c.—

Clark's No. 1, 10; No. 2, 8 gr. 33&4%  
Ferguson's. 33&4%  
Victor. 60&10&2%  
Walker's. 10%  
Attwell Mfg. Co. 25&33&4%  
Reading. 60&10&60&10&10%  
Hammond's Window Springs. 40%  
Common Sense, Jap'd, Cop'd and Br'd. # gr \$4.00  
Common Sense, Nickel Plated. # gr \$10.00  
Universal. 30%  
Kempshall's Gravity. 60%  
Kempshall's Model. 60&60&10%  
Corbin's Daisy, Hist Feb. 15, 1886. 70%  
Payson's Perfect. 60&10&10%  
Hugunin's Sash Balances. 25&5&2%  
Hugunin's New Sash Locks. 25&5&2%  
Ives Patent. 60&10&60&10&10%  
Fish (Liesche's Pat.), No. 100, # gr. \$8;  
No. 105, # gr. \$10. 50%  
Davis, Bronze, Barnes Mfg. Co. 60%  
Champion Safety List January, 1893. 70&5%  
Security. 70&5%  
Giant, Hist Jan., 1892. 60&10&10%  
Wolcott's Monarch. 50%

### Lumber Tools—

See Tools, Lumber.

### Lustro—

Four-ounce bottles. # doz, \$1.75; # gross. \$17.00

## Machines.

### Boring—

Without Augers. Upright. Angular.  
Douglas. \$5.60 \$8.75. 50%  
Snell's, Rice's Pat. 5.60 6.75 40&10&10%  
Jennings. 5.60 6.75 45&10%  
Other Machines. 2.35 2.75.  
Phillips' Patent with Augur. 7.00 7.50.  
Miller's Falls. 7.50 25%

### Fluting—

Knox, 4 1/2-inch Rolls. \$3.25 each } 35%  
Knox, 6-inch Rolls. \$3.60 each }  
Eagle, 3 1/2-inch Rolls, \$2.15. 35%  
Eagle, 5 1/2-inch Rolls, \$2.85. 35%  
Crown, 4 1/2 in., \$3.50; 6 in., \$4.00; 8 in., \$4.50 each. 35%  
Crown Jewel. 6 in., \$3.50 each, 35%  
American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each. 35%  
Domestic Fluter. each, \$1.50  
Geneva Hand Fluter, White Metal, # doz \$12.25  
Crown Hand Fluter, No. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25. 30%  
Shepard Hand Fluter, No. 85, per doz. \$15.50. 40%  
Shepard Hand Fluter, No. 110, # doz \$11.00. 40%  
Shepard Hand Fluter No. 95, # doz \$8.00. 40%  
Combined Fluter and Sad Iron. # doz \$15.00. 30%

### Holisting—

Moore's Hand Holist, with Lock Brake. 20%  
Moore's Differential Pulley Block. 40%  
Energy's Mfg. Co.'s. 25%  
Sure Grip Steel Tackle Blocks. 25%

### Washing—

Anthony Wayne, # doz, No. 1, \$42; No. 2, \$36; No. 3, \$42.  
Wayne American. # doz \$38.00  
Western Star # doz, No. 2, \$30; No. 3 \$30.  
Welsell. # doz \$54.00  
Fair and Square. # doz \$42.00

### Maillets—

Hickory. 20&10&20&10&10%  
Lignumvite. 20&10&20&10&10%  
B. & L. Block Co., Hickory & L. V. 30&30&10%

### Mattocks—Regular list.

60&10&60&10&5%

### Measures—

Standard Flywheeler, No. 1, peck # dozen, \$3.60; 4 peck, \$3.00.

### Meat Cutters—

See Cutters, Meat.

## Menders, Harness—

Per doz. \$2.00

## Milk Cans—See Cans, Milk.

## Mills—Coffee—

Box and Side, List Jan. 1, 1888. 60&10%  
Net prices are often made which are lower than above discount.  
American, Enterprise Mfg. Co., Hist Jan. 17, 1893. 20%  
The Swift, Lane Bros. 30%

## Mincing Knives—

See Knives, Mincing.

## Molasses Gates—

See Gates, Molasses.

## Money Drawers—

See Drawers, Money.

## Mowers, Lawn—

Best Machines: 10-in. \$4; 12-in., \$4.50; 14-in., \$5; 16 in., \$5.50; 18-in., \$6.  
Low-Grade Machines: 10-in. \$3; 12-in., \$3.25 14-in., \$3.50 each

## Muzzles—

Safety. # doz, \$3.00, 25%

## Nails—

Cut and Wire. See Trade Report.  
Wire Nails, Papered.  
Association list, May 1, '92. 80&10&10&5%  
Tack Mfrs' list. 70&5&70&10%  
Hungarian, Finishing, Upholsterers', &c. See Tacks.

## Horse—

American. Nos. 7 8 9 10  
Ausable. 23 26 25 24 23  
Clinton, Fin. 19 17 16 15 14 30&10%  
Essex. 28 26 25 24 23  
Lyra. 19 17 16 15 14 40&10%  
Snowden. 19 17 16 15 14 40&10%  
Vulcan. 23 21 20 19 18 25%  
Northwest'n. 25 23 22 21 20 25&25%  
A. C. 25 23 22 21 21 25&10&33&4%  
C. B. K. 25 23 22 21 21 25&10&33&4%  
Maud S. 25 23 22 21 21 40&10&5%  
Champlain. 28 26 25 24 23 40&5&5%  
Saranac. 23 21 20 19 18 40&5&5%  
Champion. 25 23 22 21 20 10&10&10%  
Capwell. 19 18 17 16 15 10&5%  
Anchor. 23 21 20 19 18 35%  
Western. 23 21 20 19 18 50%  
Empire Bronzed. 18&14 10

## Picture—

Brass Head, Sargent's list. 60&60&10%  
Brass and Copper. 60&10&60&10&5%  
Porcelain Head, Sargent's list. 50&10&10%  
Porcelain Head, Combination list. 40&10%  
Niles' Patent. 40%

## Nail Pullers—See Pullers, Nail.

## Nail Sets—See Sets, Nail.

## Nut Crackers—

See Crackers, Nut.

## Nuts—List Dec. 18, 1889.

Square. Hex.  
Hot Pressed. 6.80 6.60 off list  
Cold Punched. 5.00 6.10 off list  
In packages of 100. add 1-10%  
In packages less than 100. add 1/2%  
In net.

## Oakum—

Best or Government. # doz 6 3/4 7 1/4  
U. S. Navy. # doz 6 1/2 6 3/4  
Navy. # doz 5 6 5 1/4

## Oil Tanks—See Tanks, Oil.

## Oilers—

Zinc and Tin. 65&10&60&70&5%  
Brass and Copper. 60&10&60&10&5%  
Malleable, Hammers' Improved, No. 1, \$3.60; No. 2, \$4.00; No. 3, \$4.40 # doz. 10&10&5%  
Malleable, Hammers' Old Pattern, same list. 45%  
Prior's Pat. or "Paragon" Zinc. 60&10&10%  
Prior's Pat. or "Paragon" Brass. 50%  
Olmstead's Tin and Zinc. 60%  
Olmstead's Brass and Copper. 50%  
Broughton's Zinc. 60&10%  
Broughton's Brass. 50%  
Steel, Draper & Williams. 50%

## Openers, Can—

Messenger's Comet. # doz \$3.00, 25%  
American. # gross \$2.75 \$3.00  
Duplex. # doz 25 15&20%  
Lymen's. # doz \$3.75, 20%  
No. 4, French. # doz \$2.25, 55&60%  
No. 5, Iron Handle. # gr \$8.00, 45&50%  
Eureka. # doz \$2.50, 10%  
Sardine Scissors. # doz \$2.75 60&10%  
Star. # doz \$2.75  
Sprague, No. 1, \$2.00; 2, \$2.25; 3, \$2.50. 66&70%  
Excelsior, No. 1 \$2.50; No. 2, \$1.50. 40%  
World's Best # gross, No. 1, \$12.00. 40%  
No. 2, \$24.00. No. 3, \$30.00. 60&10%  
Universal # doz \$3.00. 55&5%  
Domestic. # doz \$2.00. 45%  
Champion. # doz \$2.00. 50%

## Packing, Steam—

## Rubber—

Standard. 70&70&10%  
Extra. 60&60&5%  
N. Y. B. & P. Co., Standard. 50%  
N. Y. B. & P. Co., Empire. 60%  
N. Y. B. & P. Co., Salamander. 25%  
Jenkins' Standard, # doz. 25&25&5%  
Miscellaneous  
American Packing. 10&10&11%  
Russia Packing. 14%  
Italian Packing. 13&14%  
Cotton Packing. 15&17%  
Jute. 7&8%

## Pails—

S. S. & Co.: 18-qt., \$7.00; 20-qt., \$7.25  
per doz. 5%

## Galvanized—

Quarts. 10 12 14  
Hill's Light Weight, # doz. \$2.75 3.00 3.25  
Hill's Heavy Weight, # dz. 2.00 2.25 2.50  
Helwig's. 2.50 2.75 3.00  
Sidney Shepard & Co. 2.35 2.85 3.05  
Iron Clad. 2.50 2.75 3.00  
Fire Buckets. 2.75 3.25 3.50  
Buckets—See Well Buckets.

## Indurated Fiber Ware—25%

Star Pails, 12 qt. # doz \$4.20  
Milk, 14 qt. # doz \$5.40  
Stable, 14 qt. # doz \$8.00  
Fire Pails, deep. # doz \$4.80  
Fire Pails, round bottom. # doz \$5.40

## Standard Fiber Ware—

Water Pails, 12 qt. # doz. \$3.60 \$4.00  
Dairy Pails, 14 qt. # doz. 4.00 4.50  
Fire Pails, No. 1, 12 qt. # doz 4.00  
Fire Pails, No. 2, 14 qt. # doz 4.50  
Sugar Pails. 5.50 6.00  
Horse Pails. 4.50  
Buggy Pails. 3.50  
Stop Jars (bal. trap). 7.50 8.50  
Chamber Pails, 14 qt. 6.00 7.00

## Pans—Dripping—

Small sizes. # doz 5 1/2 6  
Large sizes. # doz 6 1/2 7  
Silver & Co. (Cov'd). 40%

## Fry—

Standard List:  
No. 1. 0 1 2 3 4  
# doz. \$3.00 \$3.75 \$4.25 \$4.75 \$5.25  
No. 2. 5 6 7 8  
# doz. \$6.00 \$7.00 \$8.00 \$9.00  
Polished, regular goods. 75&75&10%  
Aome Fry Pans. 60&6%

## Dust—

Steel Edge, No. 1. # doz \$1.75

## Roasting and Baking—

Columbia, S. S. & Co.: Nos. 10, \$2; 20, \$2.25; 30, \$2.50 each. 50%

## Paper and Cloth—

Sand and Emery—  
List April 19, 1886. 50&10&50&10&5%  
Sibley's Emery and Crocus Cloth. 30%

## Parers—

Advance. # doz \$4.75  
Baldwin. # doz 5.25  
Banz. each 5.00  
Daisy. # doz 4.00  
Dandy. each 7.50  
Eclipse. # doz 4.25  
Eureka, 1888. each 16.00  
Family Bay State. # doz 12.00  
Favorite. # doz 5.00  
Gold Medal. # doz 4.00  
Ideal. # doz 4.00  
Improved Bay State. # doz 27.00 30.00  
Little Star. # doz 4.50  
Monarch. # doz 13.50  
New Lightning. # doz 5.50  
Oriole. # doz 4.00  
Penn. # doz 4.00  
Perfection. # doz 4.00  
Pomona. # doz 4.00  
Rocking Table. # doz 6.00  
Turn Table. # doz 4.50  
Victor. # doz 13.50  
Waverly. # doz 4.00  
White Mountain. # doz 4.00  
72. # doz 4.25  
73. # doz 7.00

## Potato—

White Mountain. # doz \$4.50  
Antrim Combination. # doz \$5.50  
Hoosier. # doz \$13.50  
Saratoga. # doz \$5.50

## Pencils—

Faber's Carpenters'. high list 50%  
Faber's Round Gilt. # gro \$5.25  
Dixon's Lead. # gro \$4.50  
Dixon's Lumber. # gro \$6.75  
Dixon's Carpenters'. 10%

## Pencils, Soapstone—

See Crayons.

## Pickers, Fruit—

Prize Fruit Pickers. 50%

## Picks—

Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$18.00. 60&10&60&10&10%

## Picture Nails—

See Nails, Picture.

## Pinking Irons—

See Irons, Pinking.

## Pins—

Humason, Beckley & Co.'s. 60&10%  
Sargent & Co.'s, \$17 and \$18. 60&10%  
Peck, Stow & W. Co. 50&10&50&10&5%

## Curtain—

Silvered Glass. net  
White Enamel. net

## Escutcheon—

Iron, Hist Nov. 11, 1885. 50&10&50&10&5%  
Brass. 60&60&5%

## Pipe, Wrought Iron—

List October 12, 1892.  
1 1/2 and under, Plain. 60&10%  
1 1/2 and under, Galv. 52&10%  
1 1/2 and over, Plain. 70&10%  
1 1/2 and over, Galv. 60&10%  
Boiler Tubes, Hist Oct. 24, 1892. 65&10%  
Casing, Hist Nov. 10, 1892. 52&10%  
Inserted Joints, Casing, Hist Nov. 18, 1892. 47&5%  
Steel Boiler Tubes. 27&5%  
Cold Drawn Seamless Steel Tubing. 50%

## Planes and Plane Irons—

Wood Planes—  
Molding. 40&40&10%  
Bench, First quality. 45&45&10%  
Bench, Second quality. 50&50&10%  
Bailey's (Stanley R. & L. Co.) 50&10%  
Bailey's (Stanley R. & L. Co.) 50&10%  
Miscellaneous Planes (Stanley R. & L. Co.) 25&10%  
Steers' Iron Planes. 50&50&5%  
Meriden Mal. Iron Co.'s. 50&50&5%  
Davis' Iron Planes. 50&50&5%  
Birmingham Plane Co. 60&60&5%  
Gage Tool Co.'s Self-Setting. 20&10&10%  
Chaplin's Iron Planes. 50&50&5%  
Sargent's. 60&60&10%  
Standard Tool Co. 50&50&5%

## Plane Irons—

Butcher's. \$5.00 \$5.25 to \$5.50  
Buck Bros. 30%  
Auburn Thistle. 30&10%  
Ohio. 30&10%  
Sandusky. 25%  
L. & I. J. White. 50&10%  
Stanley R. & L. Co. 50&10%

## Plates—

Felloe. # doz 6 1/2 6 3/4

## Pilers and Nippers—

Button's Patent. 60%  
Hall's No. 2, 5 in., \$13.50; No. 4, 7 in., \$21.00 # doz. 40%  
Humason & Beckley Mfg. Co. 50&50&10%  
Lindsay's Giant. 33&4%  
Gas Pliers. 60%  
Gas Pliers, Custer's Nickel Plated. 40%  
Eureka Pliers and Nippers. 40%  
Russell's Parallel. 25%  
P. S. & W. Timmers' Cutting Nippers. 40%  
Add 8%  
Carew's Pat. Wire Cutters. 30%  
Morrill's Parallel, # doz, \$12.00. 30&5%  
Cronk's 8 in., \$15.00; 10 in. \$20. 30%  
Cronk's Button Pattern. 50&10&60%  
Cronk's Carrier Pliers. 60&60&10%

## Plumbs and Levels—

Regular List. 75&10&75&10&2%  
Stanley's Duplex. 20&10%  
Stanley's Handy. 20&10%  
Dixton's. 40&10%  
Cook's. 40&10%  
Pocket Levels. 70&10&70&10&10%  
Davis Iron Levels. 40&10%

## Poachers, Egg—

Buffalo Steam Egg Poachers, # doz. No. 1, \$6.00; No. 2, \$9.00. 33&4%  
Silver & Co., 6-Ring, # doz, \$4.00; 8-Ring. 2.00

## Pokes, Animal—

Bishop S. I. X. L. # doz \$6.00  
Bishop's Monarch. # doz \$4.00  
Bishop's Pioneer. # doz \$4.00  
Bishop's American. # doz \$3.00  
Eagle, Double Stale. # doz \$5.75  
Eagle, Single Stale. # doz \$5.75  
Buckeye, Single Stale. # doz \$2.75  
Bolding. # doz \$6.00  
Metallic Horse Poke. # doz. \$6.00

## Police Goods—

R. I. Tool Co., Handcuffs, \$15.00 # doz 10%  
R. I. Tool Co., Leg Irons, \$25.00 # doz 10%  
Tower's. 25%  
Duley's Improved Handcuffs, 5 Hands, Polished, \$57.00 3 hands, Polished, \$47.00  
\$72.00; Nickled, \$84.00. 25%  
J. P. Lovell's Police Goods. 33%

## Polish—Metal—

Prestoline. 30%  
Prestoline, Paste. 33&4%  
Gaston's Silver Compound. 33&4%

## Stove—

Joseph Dixon's. # gro, \$8.00, 10%  
Gem. # gro, \$4.50, 10%  
Gold Medal. # gro, \$6.00, 25%  
Lustro. # gro, \$4.50, 10%  
Ruby. # gro, \$6.75  
Rising Sun, 6 gro lots. # gro \$5.50  
Dixon's Plumbago. # gro \$13.00  
Boynton's Noon Day. # gro \$13.00  
Parlor Pride Stove Enamel, # gro  
Yates' Liquid, 2 3 6 10 gal  
# gal. \$80 70 80 50  
Yates Standard Paste Polish, 10 m cans. # doz 12 1/2  
Jet Black. # gro \$3.50  
Japanese. # gro \$3.50  
Fireside. # gro \$3.50  
Diamond C. K. Enamel. # gro \$19.00  
Bonnell's Liquid Stove Polish, # gro \$9.00  
Bonnell's Paste Stove Polish, # gro \$6.00  
Black Eagle Benzine Paste, 5 and 10 m cans. 12 1/2  
Black Jack Water Paste, 5 and 10 m cans. 12 1/2  
Nickel Plate Paste. # gro \$3.00  
Crown Plate and Sand, 10 m pails, # doz \$7.50  
Black Flag. # gro \$7.50  
Black Flag, 5 and 10 m pails. # doz \$12 1/2  
Black Flag, Liquid, in bottles, # gro \$8.00  
Diamond Rock Nickel Cleaner. # gro \$10.00

## Raven Paste.

5-lb. pails, (per case of 6 or 12), # doz 19 1/2  
Less than case. # doz 15 1/2  
Liquid, 6 oz. bottles. # gross, \$3.00  
Liquid, 8 oz. bottles

**Presses—**

**Fruit and Jelly—**  
Enterprise Mfg. Co. .... 25¢  
Hemlock ..... 40¢  
Shepard's Queen City ..... 40¢  
Silver & Co. .... 25¢

**Pruning Hooks and Shears—See Shears.****Pullers Nail—**

Scranton ..... 18.00, 38.00  
Curtis Hammer ..... 18.00, 10.00  
Giant, No. 1 ..... 15.00, 10.00  
Polican ..... 15.00, 25.00  
Soloppe ..... 22.00, net  
Economy ..... 22.00, net

**Pulleys—**

Hot House, Awning, & Co. .... 60¢  
Japaned Screw ..... 60¢  
Japaned Screw ..... 60¢  
Japaned Cloth Line ..... 60¢  
Moore's Sash, Anti-Friction ..... 50¢  
Hay Fork, Solid Eye, 4.00; Swivel, 4.50 ..... 50¢  
Hay Fork, "Anti-Friction," 5 in. solid, 6.70 ..... 50¢  
Hay Fork, "F" Common and Patent, 6.70 ..... 50¢  
Hay Fork, Tarbox Pat. Iron ..... 20¢  
Hay Fork, Reed's Self-Lubricating ..... 60¢  
Shade Rack ..... 45¢  
Tackle Blocks—See Blocks.  
Moore's Anti-Friction 5 in. Wheel, 4.00 ..... 40¢  
Shepard's Niagara, 25.00 ..... 25¢  
Sash (Anger Mortise) ..... 60¢  
Common Sense ..... 60¢  
Empire ..... 60¢  
Ideal, Nos. 2, 4, 10 & 15 ..... 70¢ less 1¢  
Star ..... 20¢ net  
On bbl. lots extra 5¢  
Ideal, Nos. 25 and 55 ..... 22¢ net.

**Pumps—**

Ostern, Best Makers ..... 60¢  
Pitcher Spout, Best Makers ..... 67¢  
Pitcher Spout, Cheaper G'ds. .... 76¢

**Punches—**

Saddler's or Drive, good ..... 60¢  
Bemis & Call Co.'s Cast Steel Drive, 60¢  
Bemis & Call Co.'s Springfield Socket, 50¢  
Spring, good quality ..... 25¢  
Spring, each ..... 15¢  
Bemis & Call Co.'s Spring and Check, 40¢  
Sold Tinnings, P., S. & W. Co., 55¢  
Tinnings' Hollow Punches, P., S. & W. Co., 20¢  
Rice Hand Punches ..... 40¢  
Avery's Revolving ..... 40¢  
Avery's Sawset and Punch—See Sawsets

**Rail—**

Sliding Door, Wrt Brass ..... 35¢  
Sliding Door, Bronzed Wrt Iron ..... 40¢  
Sliding Door, Iron, Painted ..... 40¢  
Barn Door, Light ..... 2.00  
B.D. for 100 feet ..... 2.50  
B.D. for N. E. Hangers ..... 2.50  
Small Med. Large ..... 3.15  
Terry's Steel Rail ..... 2.70  
Victor Track Rail, 7½ foot ..... 4.45  
Carrier, double braced ..... 3.45  
Foot ..... 2.65  
Moore's Wrought Iron ..... 2.65  
Moody Steel Rail, 5½ ..... 4.55

**Rakes—**

Cast Steel, Association & Co. .... 70¢  
Cast Steel, outside g'ds. .... 70¢  
Malleable ..... 70¢  
Gibbs' Lawn Rake ..... 40¢  
Gibbs' Canton Lawn Rake ..... 40¢  
Gibbs' Acme Lawn Rake ..... 40¢  
Gibbs' Favorite Lawn Rake ..... 40¢  
Gibbs' Crown Lawn Rake, No. 1 ..... 40¢  
Onelda Lawn Rake ..... 40¢  
Fort Madison Prize Bow Rake ..... 65¢  
Fort Madison Steel Tooth Lawn Rake, 36.00 ..... 25¢

**Razors—**

J. R. Torrey Razor Co. .... 20¢  
Wostenholm and Butcher, 110 to 2 ..... 10¢  
Jordan's A.A.I., new list ..... 10¢  
Jordan's Old Faithful, new list ..... 10¢  
Galvanic ..... 15.00  
Electric Cutlery Co. .... 15.00  
Campbell Cutlery Co. .... 50¢

**Razor Straps—**

See Straps, Razor.

**Rings and Ringers—****Bull Rings—**

Union Nut Co. .... 55¢  
Sargent's ..... 75¢  
Hotchkiss' low list ..... 30¢  
Humason, Beckley & Co.'s ..... 70¢  
Pick, Stow & W. Co.'s ..... 50¢  
Elrich Hdw. Co., White Metal, low list ..... 50¢

**Hog—**

Top of the Hill Ringers ..... 22.00  
Top of the Hill Ringers ..... 12.25  
Hill's Improved Ringers ..... 12.25  
Hill's Old Style Ringers ..... 12.25  
Hill's Tongues ..... 3.00  
Hill's Rings ..... 3.00  
Perfect Rings ..... 1.50  
Blair's Hog Ringers ..... 2.00  
Blair's Hog Ringers ..... 2.00  
Champion Ringers ..... 2.25  
Champion Ringers, Double ..... 2.25  
Brown's Ringers ..... 1.15  
Brown's Ringers ..... 1.15  
Electric Hog Ringers ..... 2.00  
Electric Hog Ringers ..... 2.00  
Major Ringers ..... 1.25  
Major Ringers ..... 2.00

**Rivets and Burrs—**

Iron, list Nov. 17, '87 ..... 60¢  
Copper ..... 60¢  
Coppered Iron Bettina Brand ..... 40¢

**Rivet Sets—See Sets.****Roasting and Baking Pans—See Pans, Roasting and Baking.****Rods—**

Stair, Brass ..... 25¢  
Stair, Black Walnut ..... 40¢

**Rollers—**

Barn Door, Sargent's list ..... 60¢  
Acme Moore's Anti-Friction ..... 55¢  
Union Barn Door Roller ..... 70¢  
Thompson Mfr. Co.'s Lawn Rollers ..... 30¢

**Rope—The following prices are f.o.b., New York or factory, and are shaded 1/4¢ on large lots; terms, 1 1/2% for cash.**

Manila, 7-16 in. diam. and larger ..... 9¢  
Manila, 1/4 in. and 5-16 in. ..... 10¢  
Manila, Tarred Rope ..... 9¢  
Manila, Hay Rope ..... 9¢  
Sisal, 7-16 inch and larger ..... 7 1/2¢  
Sisal, 1/4 in. and 5-16 in. ..... 8 1/2¢  
Sisal, Hay Rope ..... 7 1/2¢  
Sisal, Tarred Rope ..... 7 1/2¢  
Sisal, Medium Lath Yarn ..... 7 1/2¢  
New Zealand, 7-16 in. & larger ..... 8 1/2¢  
New Zealand, 1/4 in. and 5-16 inch, 7 1/2¢  
New Zealand, Hay Rope ..... 7 1/2¢  
New Zealand, Tarred Rope ..... 7 1/2¢  
Cotton Rope ..... 13 1/2¢  
Jute Rope ..... 6 1/2¢

**Wire—**

List February, 1892. All kinds ..... 45¢

**Rules—**

Boxwood ..... 80¢  
Ivory ..... 50¢  
Starrett's Steel Rules and Straight Edges ..... 25¢

**Sad Irons—See Irons, Sad.****Sand and Emery Paper and Cloth—**

See Paper and Cloth.

**Sash Cord—See Cord, Sash.****Sash Locks—See Locks, Sash.****Sash Weights—**

See Weights, Sash.

**Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.****Saws—The following prices are generally cut by jobbers.**

Disston's Circular ..... 45¢  
Disston's Cross Cut, list Jan. 1, '93 ..... 40¢  
Disston's Hal. ..... 25¢  
Woodrough & McParlin ..... 25¢  
Hand, Panel and Rip ..... 25¢  
Cross Cuts, list Jan. 1, 1893 ..... 45¢  
Wheeler, Madden & Clemson Mfg. Co. ..... 30¢  
Hand, Panel and Rip ..... 30¢  
Cross Cuts, list Jan. 1, 1893 ..... 45¢  
Atkins' Circular ..... 40¢  
Atkins' Cross Cuts, new list ..... 40¢  
Atkins' Mule, Mill and Drag ..... 40¢  
Atkins' One-Man Saw ..... 40¢  
Peace Circular and Mill ..... 45¢  
Peace Hand Panel and Rip ..... 25¢  
Peace Cross Cuts, list Jan. 1, '93 ..... 45¢  
Richardson's Circular and Mill ..... 45¢  
Richardson's Cross Cuts, list Jan. 1, '93 ..... 45¢  
Richardson's Hand, &c. ..... 25¢  
C. E. Jennings & Co.'s brand ..... 25¢

**Hack Saws—**

Griffin's, complete ..... 40¢  
Griffin's Hack Saw Blades ..... 40¢  
Star Hack Saws and Blades ..... 25¢  
Eureka and Crescent ..... 25¢

**Scroll—**

Lester, complete, \$10.00 ..... 25¢  
Rogers, complete, \$4.00 ..... 25¢  
Barnes' Builders' and Cab Makers' ..... 15.25¢  
Barnes' Scroll Saw Blades ..... 35¢

**Saw Frames—**

See Frames, Saw.

**Saw Sets—See Sets, Saw.****Saw Tools—See Tools, Saw.****Scales—**

Hatch, Counter, No. 171, good quality ..... 18.00  
Hatch, Tea, No. 161 ..... 18.00  
Union Platform, Plain ..... 22.00  
Union Platform, Striped ..... 22.00  
Chatillon's Grocers' Trip Scales ..... 25¢  
Chatillon's Eureka ..... 25¢  
Chatillon's Favorite ..... 40¢  
Family Turnbolls ..... 30¢  
Riehle Bros. Platform ..... 40¢

**Scale Beams—**

See Beams, Scale.

**Scissors, Fluting ..... 45¢****Scrapers—**

Adjustable Box Scraper (S. R. & L. Co.) ..... 8.00  
Box, 1 Handle ..... 2.25  
Box, 2 Handle ..... 3.00  
Foot ..... 2.00  
Ship, Common ..... 3.50  
Ship, R. I. Tool Co. ..... 10¢

**Screen Window and Door**

Frames—See Frames

**Screw Drivers—**

See Drivers, Screw.

**Screws—****Bench and Hand—**

Bench Iron ..... 55¢  
Bench Wood, Hickory ..... 20¢  
Hand, Wood ..... 25¢  
Hand, Grand Rapids, list ..... 35¢

**Coach, Lag and Hand-Rail—**

Lag, Blunt Point, list Jan. 1, 1890 ..... 80¢  
Coach and Lag, Gimlet Point, list Jan. 1, 1890 ..... 80¢  
Hand Rail, Sargent's ..... 70¢  
Hand Rail, E. & B. Mfg. Co. ..... 70¢  
Hand Rail, Am. Screw Co. ..... 70¢

**Jack Screws—**

Jack Screws, Millers Falls list ..... 50¢  
Jack Screws, P., S. & W. ..... 35¢  
Jack Screws, Sargent ..... 70¢  
Jack Screws, Stearns ..... 40¢

**Cork—**

Humason & Beckley Mfg. Co. ..... 40¢  
Williamson's ..... 33 1/4¢  
Detroit Cork Screw Co. ..... 33 1/4¢

**Machine—**

Flat Head Iron ..... 65¢  
Round Head Iron ..... 60¢

**Wood—**

List January 1, 1891 ..... 70¢  
Flat Head Iron ..... 65¢  
Flat Head Brass ..... 70¢  
Round Head Brass ..... 65¢  
Flat Head Bronze ..... 70¢  
Round Head, Bronze ..... 65¢  
Rogers' Drive Screws ..... 82 1/2¢

**Scroll Saws—See Saws, Scroll.****Scythes—**

Grain ..... 40¢  
Grass ..... 40¢

**Scythe Snaths—**

See Snaths, Scythe.

**Sets—**

Awl and Tool—  
Aiken's Sets, Awls and Tools ..... 60¢  
Fray's d, Tool Hds., No. 1, 1 1/2, 2, 1 1/2, 3, 4, 5 ..... 45¢  
Millers Falls A.C.J. Tool Hds., No. 1, 1 1/2, 2, 1 1/2 ..... 25¢  
Henry's Combination Haft ..... 50¢  
Stanley's Excelsior ..... 30¢  
Common Brand Sets ..... 30¢  
No. 42, \$10.50; No. 43, \$12.50 ..... 70¢

**Nail—**

Square ..... 4.00  
Round ..... 3.25  
Cannon's Diamond Point ..... 12.20

**Rivet—**

Regular list ..... 70¢

**Saw—**

Stillman's Genuine ..... 5.00  
Stillman's Pattern, Hand, 40¢  
Cross Cut, \$5.25 ..... 55¢  
Common Lever ..... 2.00  
Morrill's No. 1, \$14.00 ..... 40¢  
No. 11, \$15.50 ..... 40¢  
No. 3 and Cross Cut, \$22.50 ..... 40¢  
No. Mill, \$30.00 ..... 40¢  
No. 10, \$15.00 ..... 40¢  
Leach's, No. 0, \$8.00; No. 1, \$15.15 ..... 20¢  
Nash's ..... 20¢  
Hammer, Hotchkiss ..... 5.50  
Hammer, Bemis & Call Co.'s new Pat. ..... 30¢

Bemis & Call Co.'s Lever and Spring Hammer ..... 30¢  
Bemis & Call Co.'s Plate ..... 10¢  
Bemis & Call Co.'s Cross Cut ..... 12 1/2¢  
Aiken's Genuine ..... 13.00  
Aiken's Imitation ..... 7.00  
Bart's Pat. Lever ..... 25¢  
Dien's Star ..... 25¢  
Leopold ..... 40¢  
Atkin's Lever ..... 5.00  
Atkin's Criterion ..... 5.00  
Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00 ..... 40¢  
Avery's Saw Set and Punch ..... 40¢  
Kohler's Royal ..... 7.00  
Kohler's Giant Royal ..... 12.00  
Crescent ..... 3.00  
Lloyd's Acme ..... 15.00  
Taintor Positive ..... 18.00

**Sharpeners, Knife—**

Larkins' ..... 6.00  
Applewood Handles ..... 6.00  
Rosewood or Cocobola ..... 6.00

**Shaves, Spoke—**

Iron ..... 45¢  
Wood ..... 30¢  
Bailey's (Stanley R. & L. Co.) ..... 40¢  
Cincinnati ..... 25¢  
Goodell's ..... 30¢

**Shears—**

American (Cast) Iron ..... 75¢  
Barnard's Lamb Trimmers ..... 3.75  
Seymour's, list Dec. 1881 ..... 60¢  
Heinisch's, list Dec. 1881 ..... 60¢  
Heinisch's Tailors' Shears ..... 33 1/4¢  
Cast Steel Trimmers ..... 80¢  
Second quality ..... 80¢  
Acme Cast Shears ..... 10¢  
Diamond Cast Shears ..... 10¢  
Clipper ..... 10¢  
Victor Cast Shears ..... 75¢  
Howe Bros. & Hubert, Solid Forged ..... 40¢  
Hatch Cutlery Co. Solid Steel Forged ..... 60¢  
Davenport Cutlery Co. ..... 60¢  
Clausen Shear Co., Japanned ..... 70¢  
Clausen Shear Co., Nickel, same list ..... 70¢  
Galvanic 3/4 to 1 in., 1.00 ..... 1 in. Electric Cutlery Co. ..... 75¢  
Campbell Cutlery Co., Jap'd ..... 75¢  
Nickel Plated ..... 65¢

**Pruning Shears and Hooks**

Disston's Combined Pruning Hook and Saw ..... 18.70  
Disston's Pruning Hook ..... 20.10  
E.S. Lee & Co.'s Pruning Tools ..... 50¢  
Pruning Shears, Henry's Pat. ..... 37.50  
Henry's Pruning Shears ..... 34.50  
Wheeler, M. & C. Co., Combination ..... 12.50  
Dunlap's Saw and Chisel ..... 18.50  
J. Mallinson & Co., No. 1, \$5.25; No. 2, \$7.25 ..... 60¢  
P. S. & W. Co. ..... 60¢  
Levin Pruner No. 1, \$15.00 ..... 40¢  
Levin Pruner No. 2, \$21.00 ..... 40¢

**Tinners', &c.—**

Shears and Snips (P. S. & W.) ..... 20.25  
Snips, J. Mallinson & Co. ..... 33 1/4¢

**Sheaves—****Sliding Door—**

M. W. Co., list July, 1888 ..... 50¢  
R. & E., list Dec. 18, 1885 ..... 55¢  
Corbin's list ..... 60¢  
Patent Roller, Hatfield's ..... 75¢  
Russell's Anti-Friction, list Dec. 18, 1885 ..... 50¢  
Moore's Anti-Friction ..... 50¢

**Sliding Shutter—**

R. & E., list Dec. 18, 1885 ..... 60¢  
Sargent's list ..... 70¢  
Reading list ..... 60¢

**Shells—**

First quality 4, 8, 10 and 12 gauge ..... 25¢  
First quality Rival, Club and Climax brands, 14, 16 and 20 gauge (7.50 list) ..... 20¢  
Star, Club, Rival and Climax Brands ..... 33 1/4¢  
Smokeless brand, 12, 10, 16 gauge ..... 33 1/4¢  
Trap brand, 12 and 10 gauge ..... 33 1/4¢  
Selbold's Comb. Shot Shells ..... 15¢  
Brass Shot Shells, 1st quality ..... 60¢  
Brass Shot Shells, Club, Rival, Climax ..... 65¢

**Shells, Loaded—**

Standard list, July 19, 1890 ..... 40¢

**Ship Tools—**

L. & I. J. White ..... 20.25

**Shoes, Horse, Mule, &c.—**

Burden's, Perkins', Phoenix, Standard, Diamond State and Bryden's Boss, at factory ..... 24.00  
Bryden's Frog Pressure, at factory ..... 25.00

**Mule—**

Add 1¢ per keg to above prices.

**Ox Wrought—**

Ton lots ..... 10.00  
1000 lb lots ..... 10.00  
500 lb lots ..... 10.00

**Shot—**

Drop, up to B, 25-b bag ..... 1.45  
Drop, up to B, 5-b bag ..... .35  
Drop, B and larger, 25-b bag ..... 1.70  
Drop, B and larger, 5-b bag ..... 1.70  
Buck and Chilled, 25-b bag ..... 1.70  
Buck and Chilled, 5-b bag ..... 2.00  
Dust Shot, 25-b bag ..... 2.00  
Dust Shot, 5-b bag ..... .45

**Shovels and Spades—**

Ames' Shovels, Spades, &c., list Nov. 1, 1885 ..... 30¢  
NOTE—Jobbers frequently give 5¢ extra on above.  
Griffith's Black Iron ..... 50¢  
Griffith's C. S. ..... 60¢  
Griffith's Solid C. S. R. R. Goods ..... 20¢  
St. Louis Shovel Co. ..... 20¢  
Bussey, Bians & Co. ..... 15¢  
Hubbard & Co. ..... 20¢  
Lehigh Mfg. Co. ..... 50¢  
H. M. Myers Co. ..... 80¢  
Payne Pettibone & Son ..... 33 1/4¢  
Remington's (Lowman's) Pat. ..... 40¢  
Rowland's Black Iron ..... 60¢  
Rowland's Solid ..... 60¢  
Terra Haute Shovel & ..... 25¢

**Shovels and Tongs—**

Iron Head ..... 60¢  
Brass Head ..... 60¢

**Sieves—**

Mann's Tin Rim ..... 50¢  
Buffalo Metallic, S. S. & Co. ..... 50¢  
Shaker (Barier's Pat.) Flour Sifters ..... 18.00  
Electric ..... 17.00  
& W. Sifters ..... 18.00  
Hunter's ..... 18.00

**Sieves, Wooden Rim—**

Mesh 18, Nested, 100 ..... 1.00  
Mesh 20, Nested, 100 ..... .95  
Mesh 24, Nested, 100 ..... 1.15

**Sinks, Wrought Steel—**

Columbus, Painted or Unpainted ..... 30¢  
Columbus, Galvanized and Enamelled ..... 60¢  
New Era, Painted ..... 40¢  
New Era, Galvanized and Enamelled ..... 60¢

**Skins, Thimble—**

Western list ..... 75¢  
Columbus Wrt. Steel, Special net price ..... 60¢  
Coldbrookdale Iron Co. ..... 60¢  
Seneca Falls Pattern ..... 60¢  
Utica P. S. T. Skins ..... 60¢  
Utica Turned and Fitted ..... 35¢

**Slates—**

School, by case ..... 60¢

**Sleds, Hand—**

Tubular Steel ..... 24.00  
(Lots of 6 doz 50¢)



**Snaps, Harness, &c.**

Anchor (T. & S. Mfg. Co.)	65%
Fitch's (Eristol)	50% to 10%
Hotchkiss	10%
Andrews	60%
Sargent's Patent Guarded	70% to 10% to 5%
German, new list	50% to 10% to 5%
Covert	50% to 10% to 5%
Covert, New Patent	50% to 10% to 5%
Covert, New R. E.	50% to 10% to 5%
Covered Spring	60% to 10% to 5%
Covert's Saddlery Works' Triumph	33%
John Protz Snaps	75% to 75%

**Snaths**

Scythe	50% to 2% to 50% to 5% to 2%
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**Soldering Irons**

See Irons, Soldering.

**Spittoons, Cuspidors, &c.****Standard Fiberware**

Cuspidors, 2 1/2-inch, # doz., No. 5, \$3; No. 5X, \$9.	
Spittoons, Daisy, 8-inch, No. 1, 4; 10 and 11 inch, \$8.	

**Spoke Shaves**

See Shaves, Spoke.

**Spoke Trimmers**

See Trimmers, Spoke.

**Spoons and Forks****Tinned Iron**

Basting, Cen. Stamp. Co.'s list	70% to 10%
Solid Table and Tea, Cen. Stamp. Co.'s list	70% to 10%
Buffalo, S. S. & Co.	33% to 2%

**Silver Plated**

months or 5% cash 30 days	
Meriden Brit. Co., Rogers	40% to 15%
O. Rogers & Bros.	40% to 15%
Rogers & Bros.	40% to 15%
Reed & Barton	40% to 15%
Wm. Rogers Mfg. Co.	40, 15% to 8%
Simpson, Hall, Miller & Co.	40, 15% to 8%
Holmes & Edwards Silver Co.	40, 15% to 8%
L. Boardman & Son	50% to 12% to 5%

**Miscellaneous**

Holmes & Edwards Silver Co.	
No. 67 Mexican Silver	50% to 10% to 5%
No. 30 Silver Metal	50% to 10% to 5%
No. 24 German Silver	50% to 10% to 5%
No. 50 Nickel Silver	50% to 10% to 5%
No. 49 Nickel Silver	50% to 10% to 5%
Wm. Rogers Mfg. Co.	
Rogers' Silver Metal	50% to 10% to 5%
15% Rogers' Nickel Silver	50% to 10% to 5%
22% Rogers' Nickel Silver	50% to 10% to 5%
German Silver	50% to 10% to 5%
German Silver, Hall & Elton	50% to 10% to 5%
Nickel Silver	50% to 10% to 5%
Britannia	50% to 10% to 5%
Boardman's Nickel Silver, list July 1, 1891	60% to 7% to 5%
Boardman's Britannia Spoons, case lots	60% to 5% cash

**Springs Door**

Torrey's Rod, 99 in.	1/2 doz. \$1.20 to 1.2
Warner's No. 1, 1/2 doz. \$1.50	No. 2, \$3.40
Gem (Coll), list April 19, 1888	20%
Star (Coll), list April 19, 1888	20% to 10%
Victor (Coll)	60% to 10% to 50% to 10% to 5%
Champion (Coll)	60% to 10% to 50% to 10% to 5%
Cowell's, No. 1, 1/2 doz. \$18.00	No. 2, \$15.00
Bubber, complete, 1/2 doz. \$4.50	55% to 10%
Mercuries	50% to 50% to 10%
Phoenix	33%

**Carriage, Wagon, &c.**

Milpitt, Concord, Platform and Half Scoll	
60% to 10% to 50% to 10% to 5%	or net prices
Cliff's Bolster Springs	25%

**Squares**

Steel and Iron	80% to 10% to 50% to 10% to 5%
Wickel-Plated	80% to 10% to 50% to 10% to 5%
Try Square and T Bevels	60% to 10% to 50%
Diston's Try Square and T Bevels	50%
Winterbottom's Try and Miter	30% to 10%
Starrett's Micrometer Caliper Squares	25%
Avery's Flush Bevel Squares	40%
Avery's Bevel Protractor	50%

**Squeezers**

Fodder	
Blair's	1/2 doz. \$2.00
Blair's "Climax"	1/2 doz. \$1.25

**Lemon**

oreclain Lined, No. 1	1/2 doz. \$6.00
Wood, No. 2	1/2 doz. \$3.00, 35%
Wood, Common	1/2 doz. \$1.70 to 1.75
Dunlap's Improved	1/2 doz. \$3.75, 20%
Sammals, No. 1, \$5.00; No. 2, \$9.12	
11% doz.	25% to 10%
Jennings' Star	1/2 doz. \$2.50
The Boss	1/2 doz. \$2.50
Dean's, Nos. 1, 1/2 doz. \$8.50; 2, \$3.35; 3, \$1.90; Queen, \$2.50	
Little Giant	50% to 50% to 10%
King	40% to 5%
Hotchkiss Straight Flash	1/2 doz. \$12.00
Silver & Co., Glass	1/2 doz. \$12.00

**Standard Fiber Ware**

See Ware, Standard Fiber.

**Staples**

Barbed Blind, 1/2 in. and larger	1/2 doz. \$7.75 to 7.75
Barbed Blind, 1/2 in.	1/2 doz. \$8.75 to 8.75
Fence Staples, Galvanized	Same price
Fence Staples Plain	as Barbed Wire
Grand Crossing Tack Co.'s list	75% to 10%

**Steelyards**

Blacksmith's	
Waterford Goods	35%
Butterfield's Goods	35%
Lighting Screw Plate	25% to 30%
Beece's New Screw Plates	25% to 30%
Reversible Ratchet	30%
Gardner	25%
Green River	25% to 30%

**Stocks and Dies**

Blacksmith's	
Waterford Goods	35%
Butterfield's Goods	35%
Lighting Screw Plate	25% to 30%
Beece's New Screw Plates	25% to 30%
Reversible Ratchet	30%
Gardner	25%
Green River	25% to 30%

**Stops, Bench**

Morrill's, # doz., No. 1, \$9.50; 2, \$12.00	
Hotchkiss's	1/2 doz. \$5, 10% to 10% to 10%
Werton's, No. 1, \$10	No. 2, \$9, 25% to 10% to 5%

**McGill's, # doz. \$3**

Cincinnati	25% to 10%
Terrell's Nos. 1 and 2, # doz., \$3; No. 3, \$3.60	30%

**Stone****Stones, Grind—See Grindstones.****Scythe Stones**

Pike Mfg. Co., list April, 1892	33% to 5%
Cleveland Stone Co., list Nov. 1892	33% to 5%

**Oil Stones, &c.**

Pike Mfg. Co.	
Hindostan No. 1, # doz.	8%
Sand Stone	5%
Turkey Oil Stone, 4 to 8 in.	40% to 40% to 10%
Turkey Stone	20%
Lilly White Washita	60%
Rosy Red Washita	60%
Washita Stone, Extra	50%
Washita Stone, No. 1	40%
Washita Stone, No. 2	30%
Lilly White Slips	60%
Washita Slips, Extra	80%
Washita Slips, No. 1	70%
Arkansas Stone, No. 1, 3 to 5 in.	\$2.30
Arkansas Stone, No. 1 1/2 to 3 in.	\$3.50
Lake Superior	13%
Lake Superior Slips	20%

**Stove Polish**

See Polish, Stove.

**Stretchers Carpet**

Cast Steel, Polished	1/2 doz. \$2.2
Cast Iron, Steel Points	1/2 doz. \$7.50 to 80%
Socket	1/2 doz. \$1.75
Bullard's	25% to 25% to 10%
Genuine Emerson	60% to 60% to 5%
Imitation	1/2 doz. \$2.00, 20% to 10% to 5%
Torrey's	20%
Badger's Belt and Com.	1/2 doz. \$2.00
Lamont Combination	1/2 doz. \$4.00
Jordan's Pat. Padded, list Nov. 1, '89, 50c	
Electric Cutlery Co.	Net
Campbell Cutlery Co.	Net

**Stuffer, Sausage**

Miles' Challenge, # doz. \$20	50% to 50% to 5%
Perry	1/2 doz. No. 1, \$15.00; No. 0, \$21.00
Draw Cut No. 4, each \$30.00	20%
Enterprise Mfg. Co., list Jan 17, '93, 25%	
Silver's	40% to 10%

**Sweepers, Carpet and Lawn**

Bissell No. 5	1/2 doz. \$17.00
Bissell No. 8	1/2 doz. \$20.00
Bissell, Grand	1/2 doz. \$36.00
Standard	1/2 doz. \$24.00
Domestic	1/2 doz. \$21.00
Domestic, No. 2	1/2 doz. \$22.00
Grand Rapids	1/2 doz. \$24.00
Crown Jewel, No. 1	\$18.00; No. 3, \$20.00
Magie	1/2 doz. \$15.00
Improved Parlor Queen	
Nickeled	1/2 doz. \$27.00
Jannaped	1/2 doz. \$24.00
Excelsior	1/2 doz. \$22.00
Grand	1/2 doz. \$18.00
Parlor Queen	1/2 doz. \$24.00
Housewife's Delight	1/2 doz. \$15.00
Ladies' Friend	1/2 doz. \$15.00
Ladies' Friend No. 2	1/2 doz. \$18.00
Advance	1/2 doz. \$18.00
Our Leader	1/2 doz. \$19.00
Triumph	1/2 doz. \$20.00
Goshen	1/2 doz. \$21.00
Supreme	1/2 doz. \$22.00
Easy	1/2 doz. \$22.00
Gilt Edge	1/2 doz. \$24.00
Acme	1/2 doz. \$26.00
Imperial	1/2 doz. \$26.00
Grand Republic	1/2 doz. \$26.00
Banner	1/2 doz. \$22.00
The Star	1/2 doz. \$21.00
Reliable	1/2 doz. \$22.00
The Rapid	1/2 doz. \$22.00
Our Own	1/2 doz. \$27.00
Model	1/2 doz. \$27.00
Crocker, Sweeper Company	Grand
Rapids, Mich., make the following rebates:	
5 dozen in 6 months	1/2 doz. \$1.00
10 dozen in 6 months	1/2 doz. \$2.00
25 dozen in 6 months	1/2 doz. \$3.00
Exception L.F., when 10 dozen price is \$13.50, and 25 dozen \$13.00.	

**Lawn**

Thompson Mfg. Co.	30%
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**Swings**

Davies Lawn	25%
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**Tacks, Brads &c.**

List October 19, 1889. Old established	
straight Weights. Short Weight goods	are sold at lower prices.
Carpet Tacks	
American, Blued	60%
American, Tin'd and Cop'd	70%
Steel, Bright and Blued	60%
Steel, Tinned and Coppered	70%
Swedes Iron, Blued	72%
Swedes Iron, Tinned	75%
American Iron Tacks, Domestic	60%
Swedes Iron Tacks	
S. S., Blued	60%
S. S., Tinned	70%
Lanc., Blued	55%
Lanc., Tinned	60%
Lanc., Tinned	60%
Gimp and Lace Tacks	
S. S., Blued	62%
S. S., Tinned	65%
Lanc., Blued	55%
Lanc., Tinned	60%
Basket and Trimmers' Tacks	
S. S.	52%
Hungarian Nails	60%
Common and Patent Brads	55%
Leathered Tacks	10%
Brush Tacks, S. S.	60%
Looking Glass Tacks, S. S.	35%
Picture-Framing Points, S. S.	35%
Finishing Nails	60%
Trunk and Ciot Nails	
Black	62%
Tinned or Coppered	65%
Basket Nails	60%
Chair Nails	52%
Cigar Box Nails	45%
Tin Capped Nails	50%

**Miscellaneous**

Double Point	90% to 90% to 10%
Wire Carpet Nails	50% to 10%
Claw Handle Carpet	1/2 gross \$4.00
Bonnie Blue	1/2 box 1 50

**Bill Nye Brad Box**

Parlan Gilt Nails, cartoon	4 00
Home Tacks, No. 50 # case (12 cartons), \$36.00; No. 100, # case (12 cartons), \$72.00	
Home Nails, No. 200, # case (12 cartons), \$30.00; No. 400, # case (12 cartons), \$60.00	
Upholsterers' Nails	50% to 10%

**Wire Brads and Nails**

Steel-Wire Brads, R. & E. Mfg. Co.'s list	50% to 10%
See also Nails, Wire	

**Tanks, Oil**

Emerald, S. S. & Co.: 30-gal. \$3.75; 60-gal., \$11 each	50% to 10%
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**Tapes, Measuring**

American	40% to 40% to 5%
Spring	40%
Chesterman's, Regular list	25% to 30%
Tin Case	30% to 30% to 10%

**Thimble Skeins—See Skeins.****Ties, Bale—Steel.**

Standard Wire, list	50% to 10% to 5%
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**Tinners' Shears, &c.**

See Shears, Tinners' &amp;c.

**Tinware**

Stamped, Jannaped and Pieced, list Jan 20, 1887	70% to 10% to 70% to 25%
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**Tire Benders, Upsetters, &c.—See Benders and Upsetters.****Tire****Tobacco Cutters**

See Cutters, Tobacco.

**Tools****Coopers'**

Bradley's	20%
Barton's	20% to 20% to 5%
L. & I. J. White	20% to 5%
Albertson Mfg. Co.	25%
Beatty's	30%
Sandusky Tool Co.	30% to 30% to 5%
Shaves Cincinnati Tool Co.	20%

**Lumber**

Ring Peavies, "Blue Line"	1/2 doz. \$20.00
Ring Peavies, Common	1/2 doz. \$18.00
Steel Socket Peavies	1/2 doz. \$21.00
Mail Iron Socket Peavies	1/2 doz. \$19.00
Can Hooks, "Blue Line"	1/2 doz. \$16.00
Can Hooks, Common Finish	1/2 doz. \$14.00
Can Hooks, Mail Socket Clasp, "Blue Line"	1/2 doz. \$16.00
Can Hooks, Mail Socket Clasp, Common Finish	1/2 doz. \$14.50
Can Hooks, Clip Clasp, "Blue Line"	1/2 doz. \$14.00
Can Hooks, Clip Clasp, Common Finish	1/2 doz. \$12.00
Hand Spikes	1/2 doz. 6 ft., \$15.00; 8 ft., \$20.00
Pike Poles, Pike & Hook	1/2 doz, 12 ft., \$11.50; 14 ft., \$12.50; 16 ft., \$14.50; 18 ft., \$17.50; 20 ft., \$21.50
Pike Poles, Pike only	1/2 doz, 12 ft., \$10.00; 14 ft., \$11.00; 16 ft., \$13.00; 18 ft., \$16.00; 20 ft., \$20.00
Pike Poles, not ironed	1/2 doz, 12 ft., \$6.00; 14 ft., \$7.00; 16 ft., \$9.00; 18 ft., \$12.00; 20 ft., \$16.00
Setting Poles	1/2 doz, 12 ft., \$14.00; 14 ft., \$15.00; 16 ft., \$17.00
Swamp Hooks	1/2 doz. \$18.00

**Saw**

Atkins, new list	40%
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**Transom Lifters**

See Lifters, Transom.

**Traps**

Newhouse	40% to 40% to 5%
Onela Pattern	70% to 10%
Game, Blake's Patent	40% to 10% to 5%

**Mouse and Rat**

Mouse Wood, Choker	1/2 doz. holes, 9 to 10%
Mouse, Round Wire	1/2 doz. \$1.50 10%
Mouse, Cage, Wire	1/2 doz. \$2.50 10%
Mouse, Catch-em-alive	1/2 doz. \$2.50 15%
Mouse, Bonanza	1/2 doz. \$9.00 to \$11.00
Rat, Decoy	1/2 doz. \$10.00, 10%
Ideal	1/2 doz. \$10.00
Cyclone	1/2 doz. \$5.25
Hotchkiss Metallic Mouse, 5-hole traps	1/2 doz., 75%; in full cases, 60% to 65%
Hotchkiss Imp. Rat Killer	1/2 doz. \$18.50
Hotchkiss New Rat Killer	1/2 doz. \$15.00
Schuyler's Rat Killer	1/2 doz. \$15.00
Dandy	1/2 doz., \$1.75

**Triers**



## Whips

American Whip Co.: Length.	3 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8 ft.
X. L. Whalebone Driving.....	\$18.00	20.00	22.00	24.00	27.00	30.00	33.00	36.00
Eureka, Two-thirds Whalebone.....	15.00	16.50	18.00	20.00				
Bull Bone, Half-length Whale.....			11.00	12.00	13.00	15.00		
American Standard.....	8.00	8.50	9.50	10.50	12.00	13.50	15.00	16.50
True Grip, Raw Hide Center.....	6.00	6.00	6.50	7.00	7.50	9.00		
New Name, Stocked Java, Black and Wine Colors.....				6.00				
American, 93 Pen Whip.....				6.00				
Gent's Light Driving No. 111.....				5.00				
Gent's Light Driving No. 108.....				5.00				
Hand-made Stocked Java No. 103.....			8.75	4.00				
A large variety of cheaper grades.....						50¢@33.00		
Team Whips.....						\$2.00@37.50		
Toy Whips.....						\$2.50@12.00		
Hardware Assortment, 10/American, 75 Whips for \$50.00.								

## Wire and Wire Goods—

## Iron—

Market.	Br. and Ann. Nos. 0 to 18.	Extra 5@10% often given
Br. and Ann. Nos. 0 to 18.	75¢@10¢75¢@10¢	
Cop'd Nos. 0 to 18.	75¢@10¢75¢@10¢	
Galv. Nos. 0 to 18.	70¢@70¢@10¢	
Tin'd, Tin'd list, Nos. 0 to 18.	70¢@70¢@10¢	
Stone, Br. and Ann'd, Nos. 16 to 18.	80¢	
Bright and Ann'd, Nos. 19 to 20.	80¢	
Br. and Ann'd, Nos. 21 to 22.	82¢@85¢	
Tinned.	65¢@10¢	
Tinned Broom Wire, 18 to 21.	45¢	
Galvanized Fence.	75¢@10¢	
Brass, list Jan. 18, 1884.	40¢@5¢	
Copper, list Jan. 18, 1884.	40¢@5¢	
Annealed Wire on Spools.	60¢	

Mallin's An'led & Tin'd on Spools..60¢5¢  
 Mallin's Brass and Cop. on Spools..50¢5¢  
 Tate's Spooled, Tin'd & Annealed..60¢5¢  
 Tate's Spooled Cop. and Brass.....50¢  
 Cast Steel Wire.....\$6.00 to 2, 30¢  
 Stub's Steel Wire.....\$6.00 to 2, 30¢  
 Steel Music Wire, 12 to 30, imported.  
 60¢@70¢ 3¢ 1¢

Wire Clothes Line, see Lines.  
 Wire Picture Cord, see Cord.

## Bright Wire Goods—

Standard list.....85¢@85¢10¢  
 Wire Cloth and Netting—  
 Painted Screen Cloth.....\$100 ft., \$2.00  
 Galvanized Wire Netting.....75¢@75¢10¢

## Wire, Barb—

See Trade Report.

## Wire Rope—See Rope, Wire.

## Wrenches—

American Adjustable.....40¢  
 Baxter's Adjustable "S".....40¢@10¢50¢  
 Baxter's Diagonal.....60¢  
 Coe's Genuine.....50¢@5¢  
 Coe's "Mechanical".....50¢@10¢  
 Girard Standard.....65¢@10¢70¢  
 Lamson & Sessions' Engineers'.....60¢@10¢  
 Lamson & Sessions' Standard.....70¢@10¢  
 P. S. & W. Agricultural.....75¢@10¢80¢  
 Girard Agricultural.....75¢@10¢80¢  
 Lamson & Sessions' Agric'l.....75¢@10¢80¢  
 W. & B. Diamond.....

Bemis & Call's:  
 Pat. Combination.....40¢  
 Merrick's Pattern.....35¢  
 Briggs's Pattern.....25¢  
 Cylinder or Gas Pipe.....40¢@5¢  
 No. 3 Pipe.....50¢  
 Aiken's Pocket (Bright).....\$6.00, 50¢@10¢  
 The Favorite Pocket.....\$4.00, 40¢  
 Webster's Pat. Combination.....35¢  
 Boardman's.....55¢@5¢  
 Always Ready.....50¢  
 Alligator.....20¢@10¢  
 Donohue's Engineer.....20¢@10¢  
 Eagle.....50¢@10¢  
 Acme, Bright.....40¢@5¢  
 Acme, Nickle.....40¢@5¢  
 Hercules.....70¢@70¢@5¢  
 Walker's.....55¢@5¢  
 Diamond Steel.....25¢@10¢  
 Cincinnati Brace Wrenches.....25¢@10¢  
 Taft's Wise Wrench.....55¢@10¢@5¢

## Wringers, Clothes—

Am. Wringer Co.'s list Jan. 2, '93. 2¢ cash  
 Colby Wringer Co., list Sept. 1, '91. 2¢ cash  
 Lovell Mfg. Co., list Jan. 1, 1892. 2¢ cash  
 Peerless Mfg. Co., list Feb., 1892. 2¢ cash  
 National Wringer & Mfg. Co., list June 1, 1892.....2¢ Cash

## Wrought Goods—

Staples, Hooks, &c., list March 17, 1893  
 85¢@10¢@5¢@15¢

## Paints, Oils and Colors.—Wholesale Prices.

## Animal and Vegetable Oils—

Linseed, City, raw, per gal.	50
Linseed, City, boiled	53
Linseed, Western, raw	50
Lard, City, Extra Winter	85
Lard, City, Prime	85
Lard, City, Extra No. 1	65
Lard, City, No. 1	55
Lard, Western, prime	83
Cotton-seed, Crude, prime	41
Cotton-seed, Crude, off grades	37
Cotton-seed, Summer Yellow, prime	46
Cotton-seed, Summer Yellow, off grades	42
Sperm, Crude	97 1/2
Sperm, Natural Spring	97 1/2
Sperm, Bleached Spring	97 1/2
Sperm, Natural Winter	1.00
Sperm, Bleached Winter	1.05
Whale, Crude	55
Whale, Natural Winter	55
Whale, Bleached Winter	55
Whale, Extra Bleached	59
Sea Elephant, Bleached	59
Winter	40
Menhaden, Crude, Sound	40
Menhaden, Crude, Southern	42
Menhaden, Light Pressed	42
Menhaden, Bleached Winter	45
Menhaden, Extra Bleached	48
Tallow, City, prime	60
Tallow, Western, prime	60
Cocoonut, Ceylon	64
Cocoonut, Cochiti	74
Cod, Domestic	38
Cod, Foreign	42
Red Elaine	42
Red Saponified	54
Bank	40
Straits	41
Olive, Italian, bbls.	63
Neatsfoot, prime	80
Palm, prime, Lagos	74

## Mineral Oils—

Black, 29 gravity, 25 @ 30 cold test.....	7
Black, 29 gravity, 15 cold test.....	7 1/2
Black, 29 gravity, 15 cold test.....	7 1/2
Black, 29 gravity, 15 cold test.....	7 1/2
Cylinder, light, filtered.....	14

Cylinder, dark, filtered.....	10
Paraffine, 23 1/2 @ 24 gravity.....	11
Paraffine, 25 gravity.....	10
Paraffine, 28 gravity.....	7 1/2
Paraffine, red.....	9 1/2

## Paints and Colors—

Barytes, Foreign, 15 ton.....	\$22.00
Barytes, Amer. doated.....	\$20.00
Barytes, Amer. No. 1.....	\$16.00
Barytes, Amer. No. 2.....	\$13.00
Barytes, Amer. No. 3.....	\$11.00
Blue, Celestial.....	40
Blue, Chinese.....	40
Blue, Prussian.....	25
Blue, Ultramarine.....	3
Brown, Spanish.....	3 1/2
Brown, Vandyke, Amer.....	3 1/2
Brown, Vandyke, English.....	6
Carmine, No. 40, in bulk.....	2.75
Carmine, No. 40, in boxes or barrels.....	2.85
Carmine, No. 40, in ounce bottles.....	3.75
Chalk, in bulk.....	2.25
Chalk, in bbls. \$100 b.....	33
China Clay, English.....	13.00
Cobalt Oxide, prep'd.....	9.00
Cobalt Oxide, black.....	1.90
Cobalt Oxide, black, less 100 b.....	1.96
Green, Paris, 170 @ 175 b.....	10 1/2
Green, Paris, small pack.....	12
Green, Chrome, ordinary.....	17
Green, Chrome, pure.....	22
Lead, Eng., B.B. white.....	8 1/2
Lead, Amn. White, dry or in oil.....	7
Kegs, lots less than 500 b.....	6 1/2
Kegs, lots 500 b to 5 tons.....	6 1/2
Kegs, lots 5 tons to 12 tons.....	6 1/2
Kegs, lots 12 tons and over.....	6 1/2
Lead, White, in oil, 25 b tin pails, add to keg price.....	1
Lead, White, in oil, 12 1/2 b tin pails, add to keg price.....	1
Lead, White, in oil, 1 to 5 b assorted tins, add to keg price.....	2 1/2
Lead, Red, bbls. and 1/2 bbls.....	6 1/2
Lead, Red, kegs.....	6 1/2
Litharge, kegs.....	6 1/2
Litharge, bbls. and 1/2 bbls.....	6

TERMS, &c.—Lead and Litharge.—On lots of 500 b or over, 60 days' time or 2 1/2 % discount for cash if paid within 15 days of date of invoice.  
 Ocher, Rochelle.....1.35  
 Ocher, French Washed.....1 1/2  
 Ocher, German Washed.....1 1/2  
 Ocher, American.....1 1/2  
 Orange Mineral, English.....8 1/2  
 Orange Mineral, French.....10  
 Orange Mineral, German.....8 1/2  
 Orange Mineral, American.....8 1/2  
 Paris White, English Cliff stone.....1.00  
 Paris White, American.....65  
 Red, Indian, English.....8 1/2  
 Red, Indian, American.....2  
 Red, Turkey.....9  
 Red, Tuscan.....9  
 Red, Venetian, American.....9  
 Red, Venetian, English.....1.20  
 Sienna, Italian, Burnt and Powd.....4  
 Sienna, Ital., Burnt Lumps.....1 1/2  
 Sienna, Ital., Raw, Powd.....4 1/2  
 Sienna, Ital., Raw, Lumps.....1 1/2  
 Sienna, American, Raw.....1 1/2  
 Sienna, American, Burnt and Powd.....1 1/2  
 Talc, French.....1 1/2  
 Talc, American.....1 1/2  
 Terra Alba, Fr'ch, \$100 b.....95  
 Terra Alba, English.....70  
 Terra Alba, American No. 1.....65  
 Terra Alba, American No. 2.....45  
 Umber, Turkey, Burnt and Powdered.....3 1/2  
 Umber, Turkey, Raw and Powdered.....3 1/2  
 Umber, Turkey, R'w Lumps.....2 1/2  
 Umber, Turkey, Bnt. Amer.....1 1/2  
 Umber, Turkey, R'w Amer.....1 1/2  
 Vermilion, American Lead.....11 1/2  
 Vermilion, Quicks'er, bulk.....57  
 Vermilion, Quicks'er, bags.....58  
 Vermilion, Quicksilver sm'r pks.....62  
 Vermilion, English Import.....85  
 Vermilion, Imitation, Eng.....8  
 Vermilion, Trieste.....90  
 Vermilion, Chinese.....92 1/2  
 Whiting Common, \$100 b.....37 1/2  
 Whiting Gilders.....45

Zinc, American, dry.....\$ 4 1/2  
 Zinc, French, Red Seal.....7 1/2  
 Zinc, French, Green Seal.....9  
 Zinc, French, V. M. X.....7  
 Zinc, Antwerp, Red Seal.....7 1/2  
 Zinc, Antwerp, Green Seal.....7 1/2  
 Zinc, German, L. Z. O.....6 1/2  
 Zinc, V. M. in Poppy Oil, G Seal, lots of 1 ton and over.....10 1/2  
 Zinc, V. M. in Poppy Oil, lots less than one ton.....11  
 Zinc, V. M. in Poppy Oil, Red Seal, lots of 1 ton and over.....10 1/2  
 Zinc, V. M. in Poppy Oil, lots less than 1 ton.....10 1/2  
 Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1 1/2; 25 bbls. 2 1/2; 50 bbls. 4 1/2. No discount allowed on less than bbl. lots.

## Colors in Oil—

Black, Drop, Frankfort.....25  
 Black, Drop, English.....12  
 Black, Drop, Domestic.....7  
 Black, Lampblack, Best.....20  
 Black, Lampblack, Common.....7  
 Black, Ivory.....35  
 Blue, Chinese.....20  
 Blue, Prussian.....20  
 Blue, Ultramarine.....12  
 Brown, Vandyke.....7  
 Green, Chrome.....8  
 Green, Paris.....18  
 Sienna, Raw.....7  
 Sienna, Burnt.....7  
 Umber, Raw.....7  
 Umber, Burnt.....7

## Putty—

In barrels and 1/2 bbls.....01 1/2  
 In tubs.....01 1/2  
 In cans.....01 1/2  
 In bladders.....01 1/2

## Spirits Turpentine—

In regular bbls.....31  
 In machine bbls.....31 1/2

## Glue—

Low Grade.....8  
 Cabinet.....12  
 Medium White.....13  
 Extra White.....17  
 French.....10  
 English.....10  
 Irish.....12

All Inside Parts Tinned.

Cedar Tubs.

Freeze The Quickest

Run The Easiest

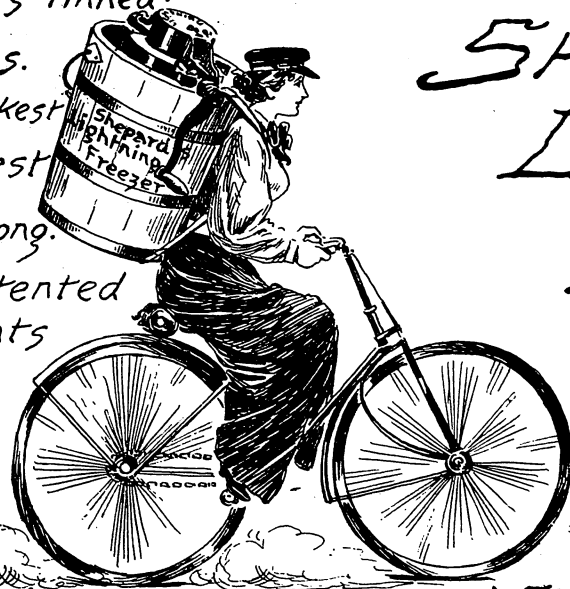
Extra Strong.

Have More Patented

Improvements

Than other

FREEZERS.



SHEPARD'S  
 LIGHTNING  
 FREEZERS

THE SUMMER GIRL OFF FOR A TOUR.

Pacific Coast Representatives, CHAS. L. PIERCE & CO., 202 Market St., SAN FRANCISCO, CAL.  
 Canadian Representative, H. D. SIMMONS, 85 York St., TORONTO, ONT.

Shepard  
 Haw Co  
 Sole Makers  
 Buffalo, N.Y.



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